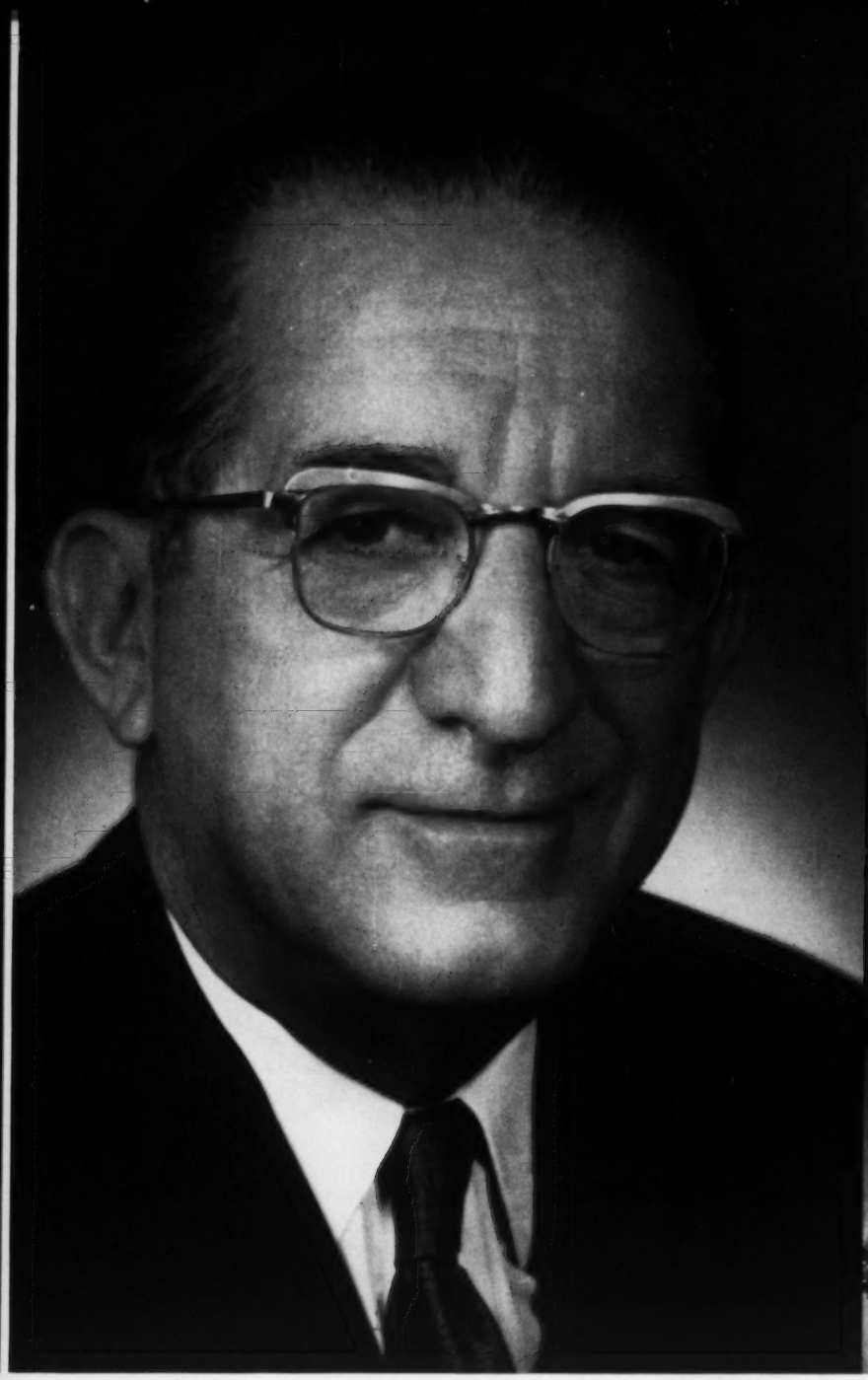
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
JULY 17, 1961



PROGRAM FOR MANAGEMENT

Invent for Profit Growth

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Judson S. Sayre, chairman, Norge Div., Borg-Warner Corp.

Auto Talks Will Boil Down to Fringes . . 71

AC Motors Gain in Heavy Duty Uses . . 116

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Galvanized Sheets Head for Record . . 155

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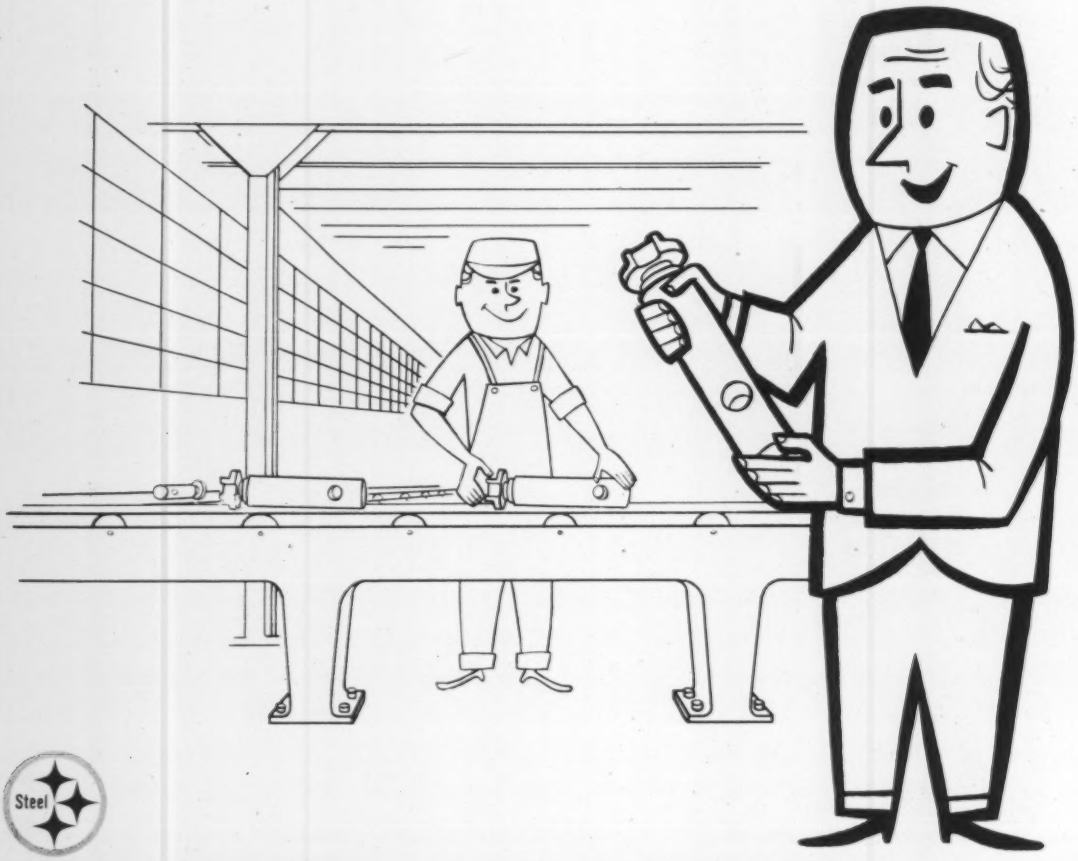

YOUR PRODUCT COSTS LESS AT THE END OF THE LINE

when you start with B&W Job-Matched Mechanical Tubing

Here's how B&W makes unit cost savings possible on machined, formed and structural parts. First, B&W gives you unbiased assistance in choosing the proper stainless, alloy or carbon steel grade of seamless or welded tubing. Uniform physical and mechanical properties—hot or cold finishing—standard or special tolerances—proper heat treatment—are then built into the tube depending on your fabricating procedures and end-use application. When B&W Job-Matched Mechanical Tubing goes on the line you can be sure it's as close as possible to the finished part. It also has optimum machinability or formability. The result: some fabricating operations are eliminated. Others are speeded up. Your end product comes off the line at maximum rate of output—at minimum unit cost.

Make good fabricating sense? To find out more, contact your local B&W District Sales Office or Steel Service Center. Meanwhile, write for Bulletin TB-430. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

B&W

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TUBULAR PRODUCTS DIVISION

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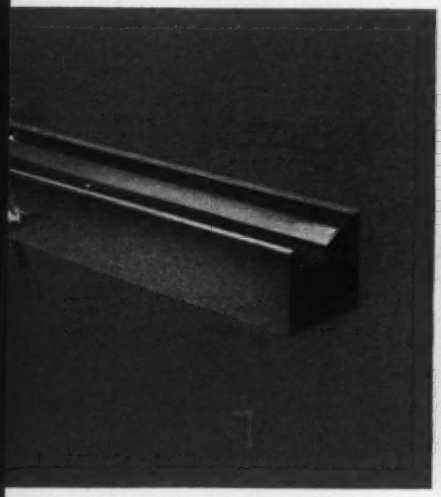
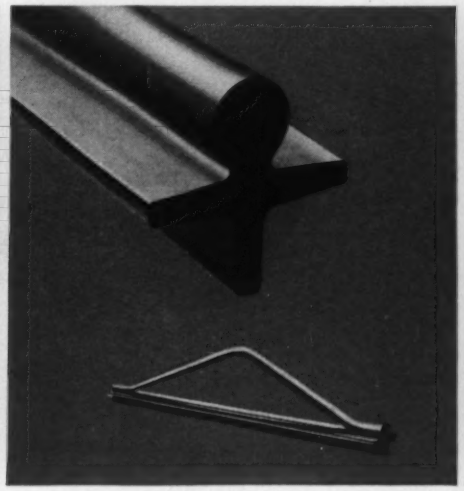
Seamless and welded tubular products, solid extrusions, rolled rings, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

How to cut costs to make a better product



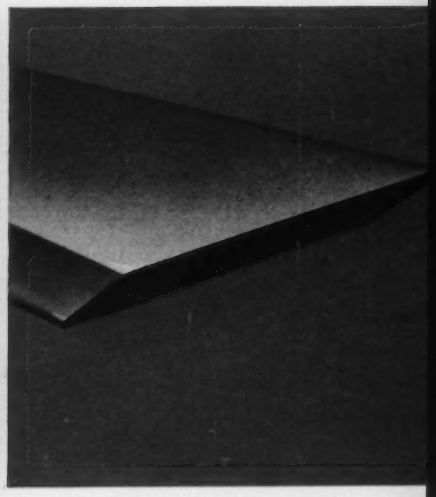
Costly machining eliminated

Manufacturer used to machine square stock to produce typewriter carriage rails. By changing to this special steel section, accurately hot-rolled and then cold-drawn to precise dimensions, he eliminated much costly machining, avoided scrap loss. Production rate was increased considerably.



For greater strength and durability

This custom-rolled section makes possible the economical fabrication of a railroad brake beam. Our customer first separates most of the "round" section from the "tee" by splitting the web between them to points near each end of the bar. He then compresses the "tee" portion of the bar, reducing its length and forcing the "round" outward to form a unitized truss. He reports this one-piece beam gives more reliable service, and is stronger than beams made by welding, bolting, or casting.



Faster production . . . using less steel

Our customer produced grader blades by flamecutting square-edge plate. By substituting this double-bevel special section, he eliminated the cutting operation, improving both his production rate and the appearance of his product. Because less steel is needed, the section costs less per foot, and shipping costs are reduced.

DESIGN WITH SPECIAL BAR SECTIONS, HOT-ROLLED TO YOUR SPECIFICATIONS

When you use special sections you buy less steel. You generate less scrap. Shipping and handling costs go down. Special sections reduce machining and fabricating operations and cut production costs. Special sections provide more freedom of design, and a stronger, more durable product—a product that has more sales appeal.

Could you use special bar sections, hot-rolled to your own product specifications? We'd be happy to discuss the possibilities with you . . . just call or write the Bethlehem sales office nearest you.

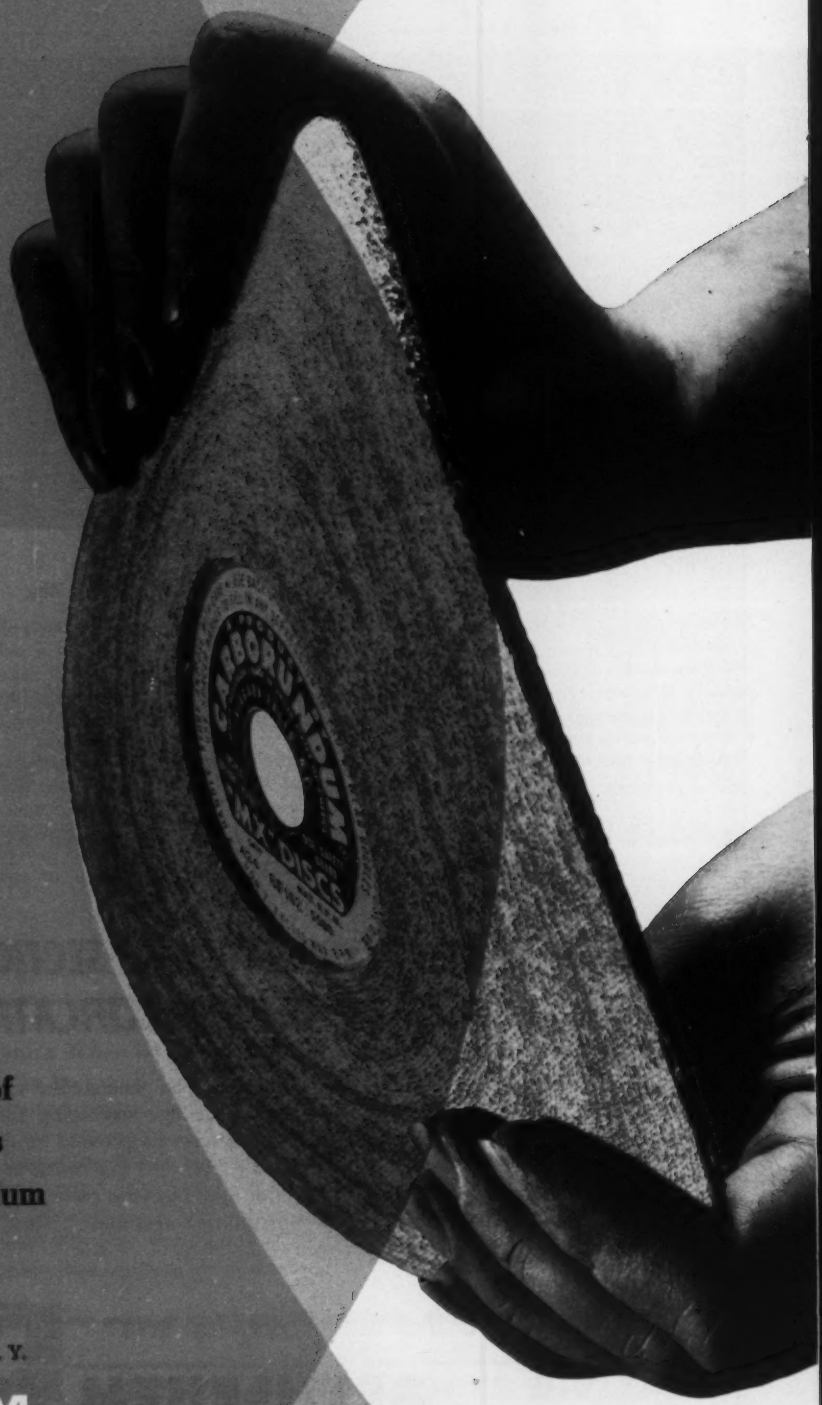
Steel *for Strength . . . Economy . . . Versatility*

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

NOW... ROUGH GRIND AND FINISH WITHOUT CHANGING DISCS



• • • get up to 20 times longer life with new flexible MX® Discs.

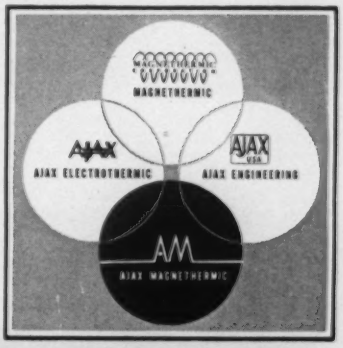
Now you can end forever the costly, time-consuming annoyance of changing discs between roughing and finishing. To take off metal rapidly with the new flexible MX® disc, simply bear down—watch the disc hug the workpiece as it grinds off stock. Then let up and finish the job with an easy smooth motion—all with the same disc! Use this remarkable new abrasive tool on flat work or on contours. Use it to remove welds, take out dents and imperfections—for hundreds of jobs on regular steel, stainless or aluminum. Your Carborundum distributor or representative will be glad to help.

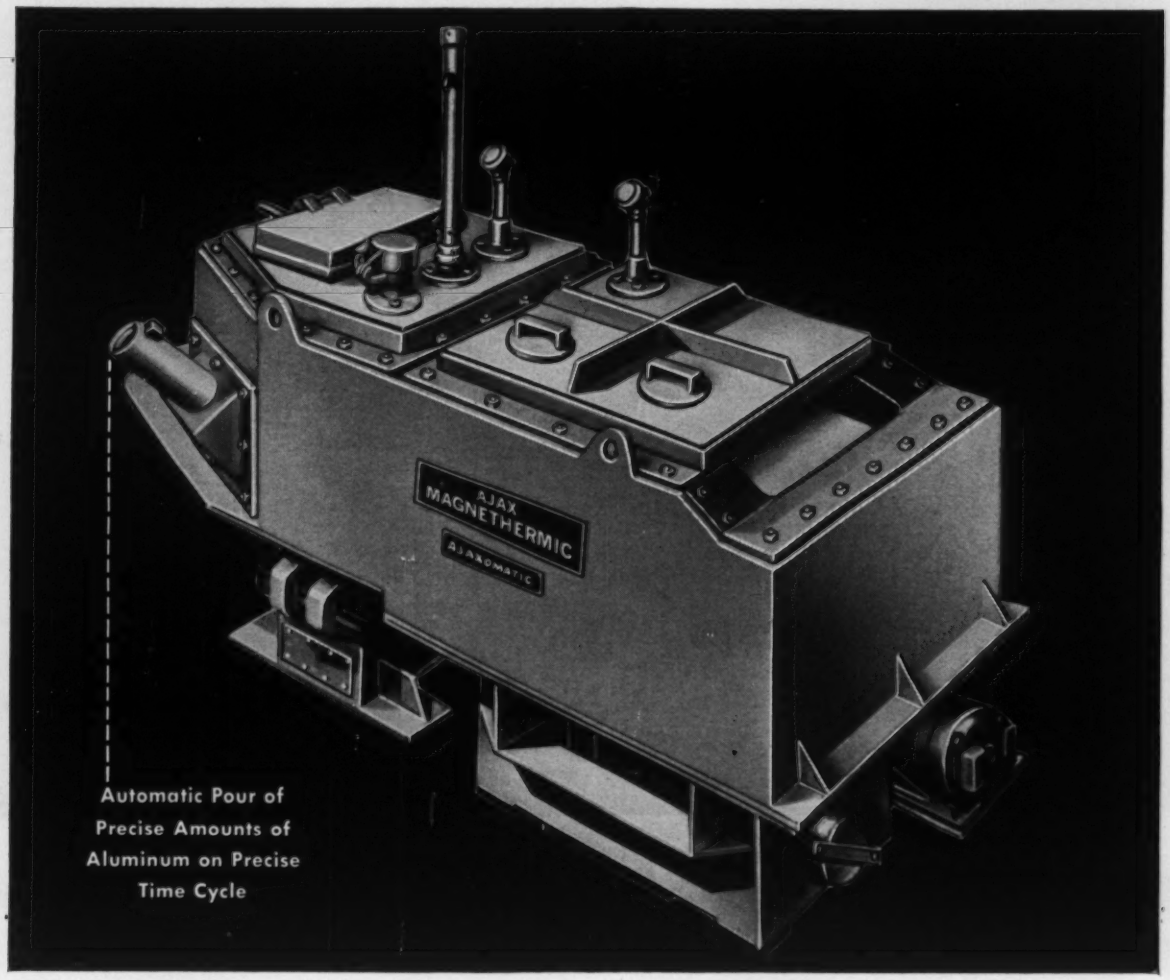
Bonded Abrasives Division • Niagara Falls, N. Y.

CARBORUNDUM

AJAXOMATIC pours molten aluminum automatically to die casting machines.

Use: Whenever high speed, high casting weight or high quantity requirements make hand ladling too slow or too costly. *How:* Ajaxomatic (60-cycle core type induction furnace) automatically supplies molten aluminum to the machine in any size "shot" on precise time cycle. *Experience:* There are many Ajaxomatics in use. Some of the largest die castings produced are poured with Ajaxomatic. *Inquiry:* Write direct to us for additional information on Ajaxomatic Automatic Pouring Furnace by induction.





Automatic Pour of Precise Amounts of Aluminum on Precise Time Cycle

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"induction heating is our only business"

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Tom Gilbert shifts gears 675 times a day and likes it. Operating a new Warner & Swasey No. 5 Turret Lathe, Tom dials the proper speed on the Preselector, then flicks the lever and gets an instant automatic shift. He gives his employer, John N. Martin, Manufacturer, 50% higher output than possible on older turret lathes in the shop. The **Warner & Swasey** Company, Cleveland.

Forecaster

Peering confidently toward the horizon is Associate Editor Bill Wallace, our Pittsburgh man. He's got to be confident because he makes predictions every week. As the author of STEEL's "Market Outlook" (Page 153), he forecasts ingot tonnage production in the weeks, months, and even quarters ahead.

His column is also usually a source of quotes from STEEL that appear in many newspapers every Monday throughout the nation.

Bill joined us as an assistant editor in 1957 and became an associate editor when he went to Pittsburgh in 1958. He has served in sales and managerial capacities with several firms, was with the Army's Counter Intelligence Corps, was a supervisory trainee for the Goodyear Aircraft Corp., and is a 1951 graduate of Amherst College.

Sardonic Mottos

We're still getting a flood of samples to add to our collection. Here are a few from last week's mail:

Money can't get you friends, but it can bring a better class of enemies . . . submitted by Carl H. Young of Bonney Forge & Tool Works, Allentown, Pa.

Blessed are they who go around in circles for in time they shall become known as wheels . . . submitted by Arthur L. Schoeni of Chance Vought Corp., Dallas.

Don't just do something—stand there . . . submitted by Wolverine Tube Div., Allen Park, Mich., Calumet & Hecla Inc.

If I save up 320 coffee breaks, can I use them for a two week vacation? . . . submitted by Andrew Hopple of Nutone Inc., Cincinnati.

He has others we like:

You know what? Of course you don't.

How to support a wife in the manner to which she has been accustomed . . . let her keep her job.

Auto Labor Coverage

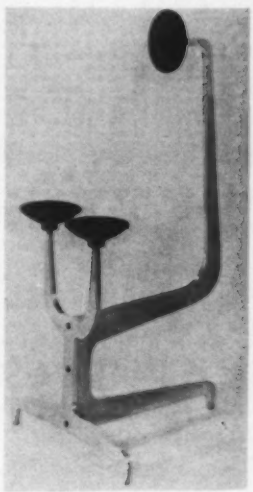
A six-man team of editors—John Morgan, Bill Dean, Don Postma, Jack Botzum, Don Hammerstrom, and Bob Jaynes — has been researching and writing to bring you an analysis of developments in the auto contract talks, the most important labor negotiation in 1961.

Their first installment appeared May 29 (p. 37). Subsequent reports have been carried nearly every week since; for the latest, turn to Page 71. They'll be coming regularly until new contracts are signed, which the editors believe will happen without a strike.

Word from Geraldine

Geraldine, cleaning woman on our floor and night editor, has returned from a two week vacation to report that business is improving. Three nephews in Detroit, two cousins in Pittsburgh, and a brother in Baltimore are working full time now after being on short weeks or laid off.

Guess What?

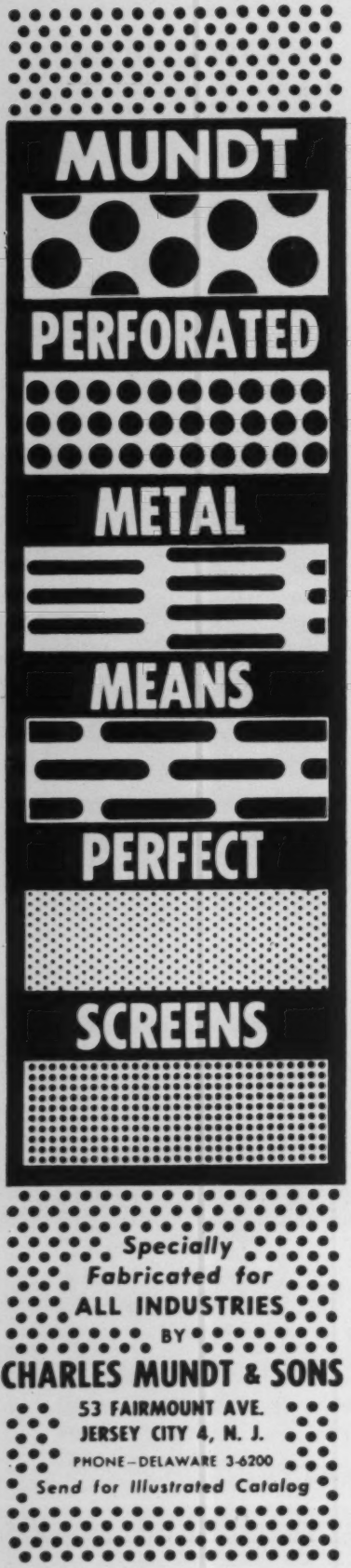


Appearance notwithstanding, it fits them all, large or small. What is it?

We'll give you another hint: It's made of ½ in. aluminum plates and was designed by Stephen J. Kimmell, industrial design student at the Institute of Design, Illinois Institute of Technology. It was developed under Aluminum Co. of America's design education program.

Send your guesses.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.



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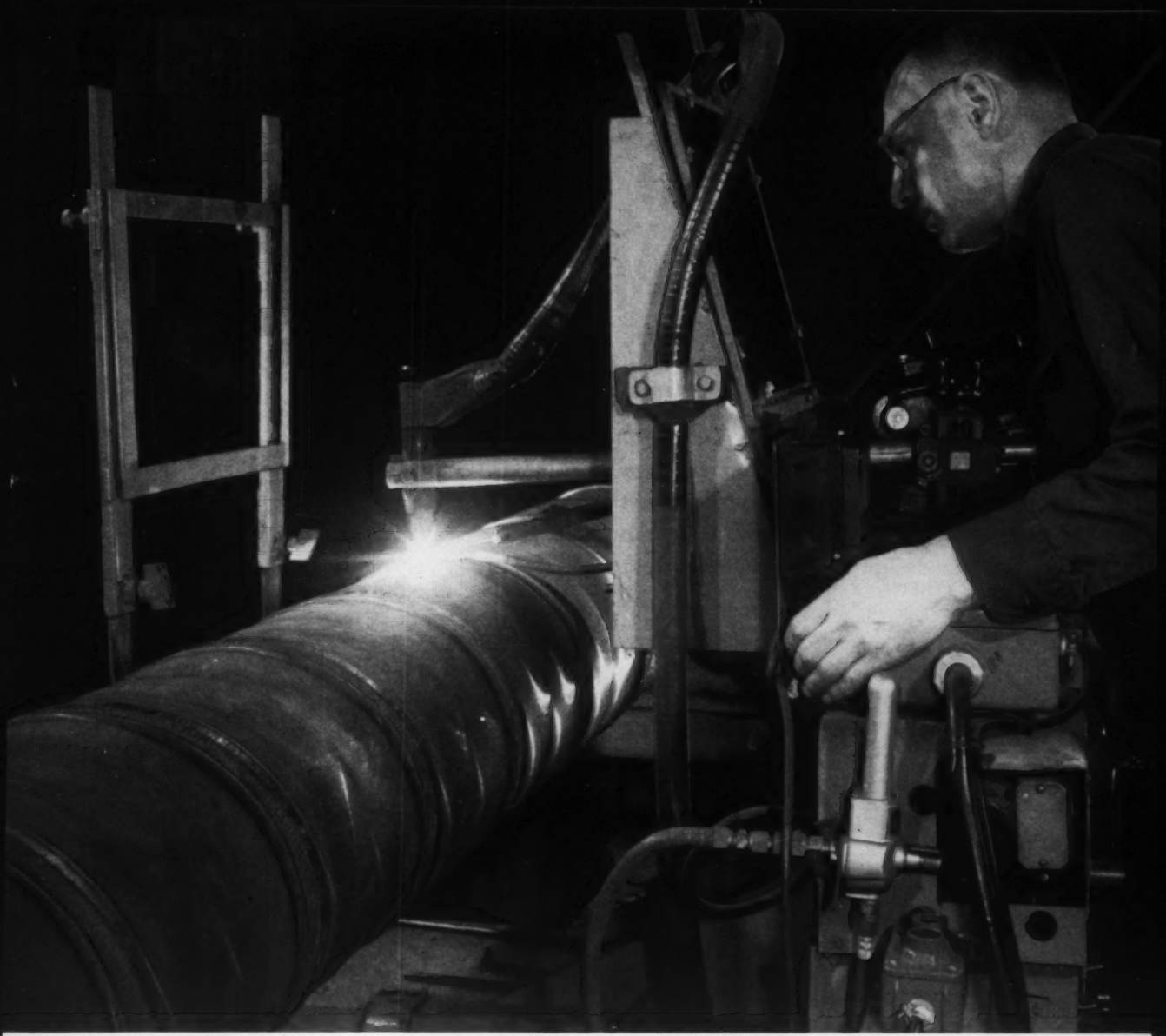

HAYNES STELLITE cobalt-base alloy, deposited mechanically, is used to hard-surface this 12 in. diameter, 24-ft. plastic-extrusion screw.

Hard-Facing?

There's a
HAYNES Alloy
for the Job!

What happens to hard-facing quality when you switch from manual to automatic? Here's a typical case:—

Sound, smooth, non-porous deposits were being achieved manually on the flights of big conveyor screws. As production volume increased, HELIARC automatic hard-facing promised economies.

After the switch, deposits were of the same high quality. Economies soared. The key: A HAYNES STELLITE cobalt-base alloy—equally reliable whether deposited manually or by machine. And note this: The automatic method cut deposition time up to 40 per cent. Saved 10 to 15 per cent in material.

Whatever hard-facing method you select as most economical, remember there's a HAYNES alloy that will work with it . . . and do an outstanding job of protecting the part. HAYNES alloys come as powders, bare rods, electrodes, tubes and coils. Write for full information.

HAYNES
ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

Address inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, N.Y.

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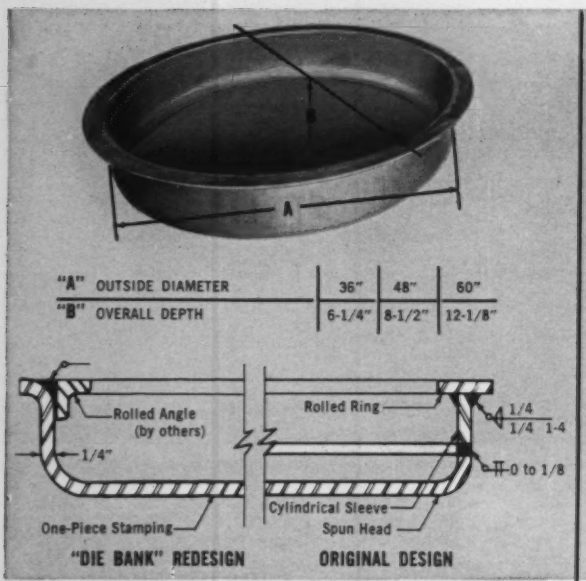
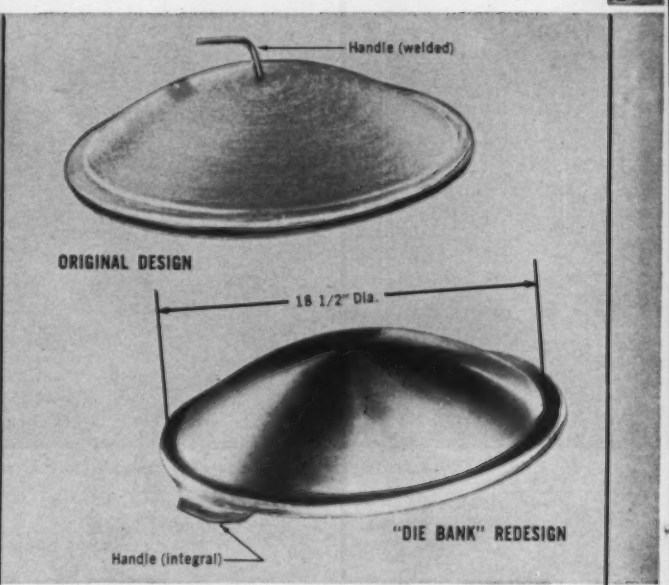
Superior Parts at Lowered Cost with This Fresh Approach to Stamping

Many parts in use today are better as a result of design refinements suggested by COMMERCIAL's stamping experts. The examples below demonstrate how these design refinements have resulted in superior parts for the OEM at lowered cost. These examples may appear to you as unusual in design and this is the point...





One Piece Stamping . . . Improves Appearance, Replaces Three Piece Weldment

Circular steel boiler doors 36", 48", 60" diameter were formerly fabricated from three basic components—spun head, cylindrical sleeve and ring rolled the hard way.

Problem: eliminate accumulative assembly variables caused by inherent non-uniformity of three components—upgrade product appearance.

Solution: one piece smooth surface COMMERCIAL steel stamping shaped in a die assembled from stock "die bank" components (for details of "die bank", see box upper right). Stamping tolerances plus or minus 1/16" (flat across flange within 1/16"). Result—accurate finished product because former difficult assembly and time-consuming fitting-up problems eliminated. All outside exposed welds (about 16 ft. on the 48 in. side) and grinding discontinued. An end product with improved appearance—better product appeal.

Stampings . . . Unitize Construction, Replace Inaccurate Stainless Steel Spinnings

Original contruction of bulk milk cooler used tank manhole cover spinning—requiring welding, grinding and polishing.

Problem: reduce production finishing time, overcome welding heat distortion of stressed metal-spinnings, increase strength, produce uniform parts and improve sanitation properties.

Solution: COMMERCIAL's "die bank" proved a nucleus for a one-piece stamping redesign including integral handles. Basic stamping details—size, shape and gauge were tailored to stock die components. Realization—smoother finish of stamping creates a more sanitary, better appearing tank. Closer tolerances of stamped cover provide flange with definite "drop-on" vacuum seal. Fewer parts resulting from stamping. Unitization greatly diminishes production time and component cost.

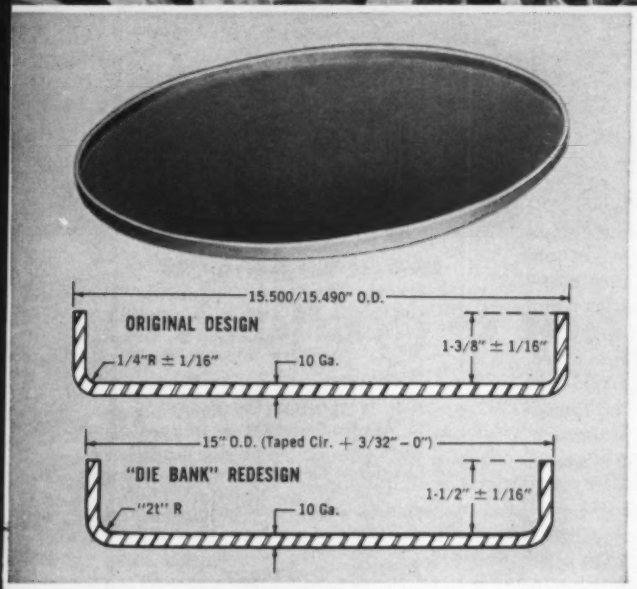
"Die Bank" Facts

Over 50,000 stock die components stand ready to go to work for you at COMMERCIAL. These components can be combined in endless variety—can prove, as they have for others, invaluable in your stamping design.

Components for circular stampings cover a diameter range from 2½" to 72". To 30" O.D., increments are in units of 1". Over 30" O.D., increments progress from 1" up to 6" for the largest diameter. Under 24" O.D., many sizes are available in fractional inches.

Stampings from these die components range from 20 gauge to ¾" thick. Contour can be flat or dished to any one of many patterns. Stampings can be supplied with vertical, horizontal or reverse flanges—or without any flange.

Use of COMMERCIAL's "die bank" results in many stampings made to basic original design free of heavy tooling cost—minor design latitude often eliminates all die expense. Catalog 200-C1 "Standard Metal Shapes" should be in your hands when preliminary designs go on the board.



"Die Bank" Stamping Gets O. K. . . .
Reduces Cost of Tailored Design

Original design of agriculture combine cylinder head called for odd fractional dimensions. Tolerances were tighter than necessary and applied in conflict with best stamping practice. Details were established without knowledge of COMMERCIAL's "die bank". Result—high unit cost to produce basic part to individually tailored size. Special dies, not in existence, were required.

Problem: redesign a more practical part to be mass produced at low unit-cost—eliminate special die cost.

Solution: simple redesign using stock die components from COMMERCIAL's "die bank" cancelled out $1850 partial die cost required for tooling original design. Net die cost: zero. Piece price reduced: 16 cents. Savings on initial requirement: over $2200. A stamping made to commonly accepted tolerances at lower cost without sacrificing product quality was the answer.

Advantages of Stampings

Economy of production
—metal conservation, waste material minimized, stamped parts have greater surface area than blank the part is made from—without loss in strength
—high quantity man-hour output from fast production machines—low unit cost

Greater strength: predicted, controlled, unvarying
—higher proportionately, in relation to weight, than possible in other metalworking processes

Enhanced appearance: finish is predictable, uniform, "as specified"
—multiple selection of basic material and its finish facilitates maintaining appearance in stamping the part or its further processing

Features of COMMERCIAL Stampings

Specialized equipment
—modern presses with capacity over 2000 tons; facilities located in three strategic metal producing centers

Economical large or small runs
—medium to heavy, shallow or deep drawn stampings

Facilities for finishing
—drilling, boring, tapping, machine trimming, burning, welding, painting, etc.

While designs are on the board, or redesign of parts in usage are fresh in mind, why not call on COMMERCIAL'S technical service—send print, sketch, sample or prototype. Address: Commercial Shearing & Stamping Company, Dept. L-29, Youngstown 1, Ohio.

COMMERCIAL
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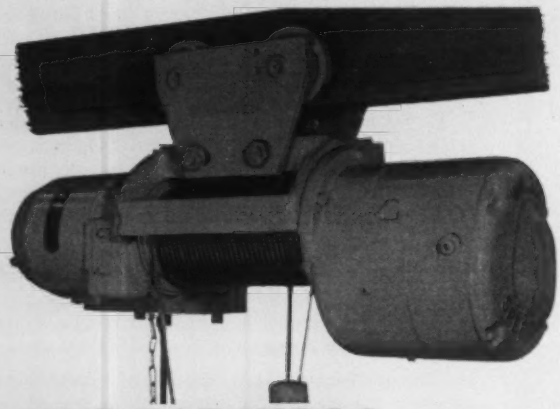
Introducing

a New Member of the Wright Speedway Hoist Family...



The W-1 ELECTRIC...BUILT TO YOUR NEEDS FOR SPEEDY, RUGGED DUTY IN CLOSE HEADROOM LOCATIONS

The W-1 Speedway is a hoist it will pay you to meet without delay. Completely new in design, it can be tailor-made to your exact job requirements for high handling efficiency, low maintenance costs and longer service life. You can choose the W-1 in capacities from 1 to 3 tons...with single, two-speed or variable speed controls... lug or base mounting; plain, geared or motorized trolleys...two or four part reeving. For close headroom application, the WH-1 is available in capacities of 1 to 2 tons. Both models can be equipped with Wright's own built-in overload cut-off for 3-way protection of operator, load and hoist. Hoists are factory tested at 50% above rated capacity before overload equipment is installed.

OTHER W-1 SPEEDWAY FEATURES

Motors—Fully enclosed, ball bearing type. Built to NEMA specifications and rated on basis of 30-minute duty cycle.

Bearings—Anti-friction, precision ball or roller bearings support both ends of all shafts. They are mounted in splash oil lubricated gear chamber.

Motor Brake—External expanding jaw, self-adjusting cam type; operated by solenoid.

Drum—Fabricated all-steel construction with liberal drum to cable diameter ratio to reduce wear and cable fatigue.

ACCO

See your Wright Distributor

for complete information about the W-1 or write us at York, Pa. for Bulletin DH-173

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc.

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CALENDAR
OF MEETINGS

Aug. 16-19, Society of Automotive Engineers: National meeting, West Coast, Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-13, American Mining Congress: 1961 mining convention, Hotel Olympic, Seattle. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 11-15, Instrument Society of America: Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 14-16, Packaging Machinery Manufacturers Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

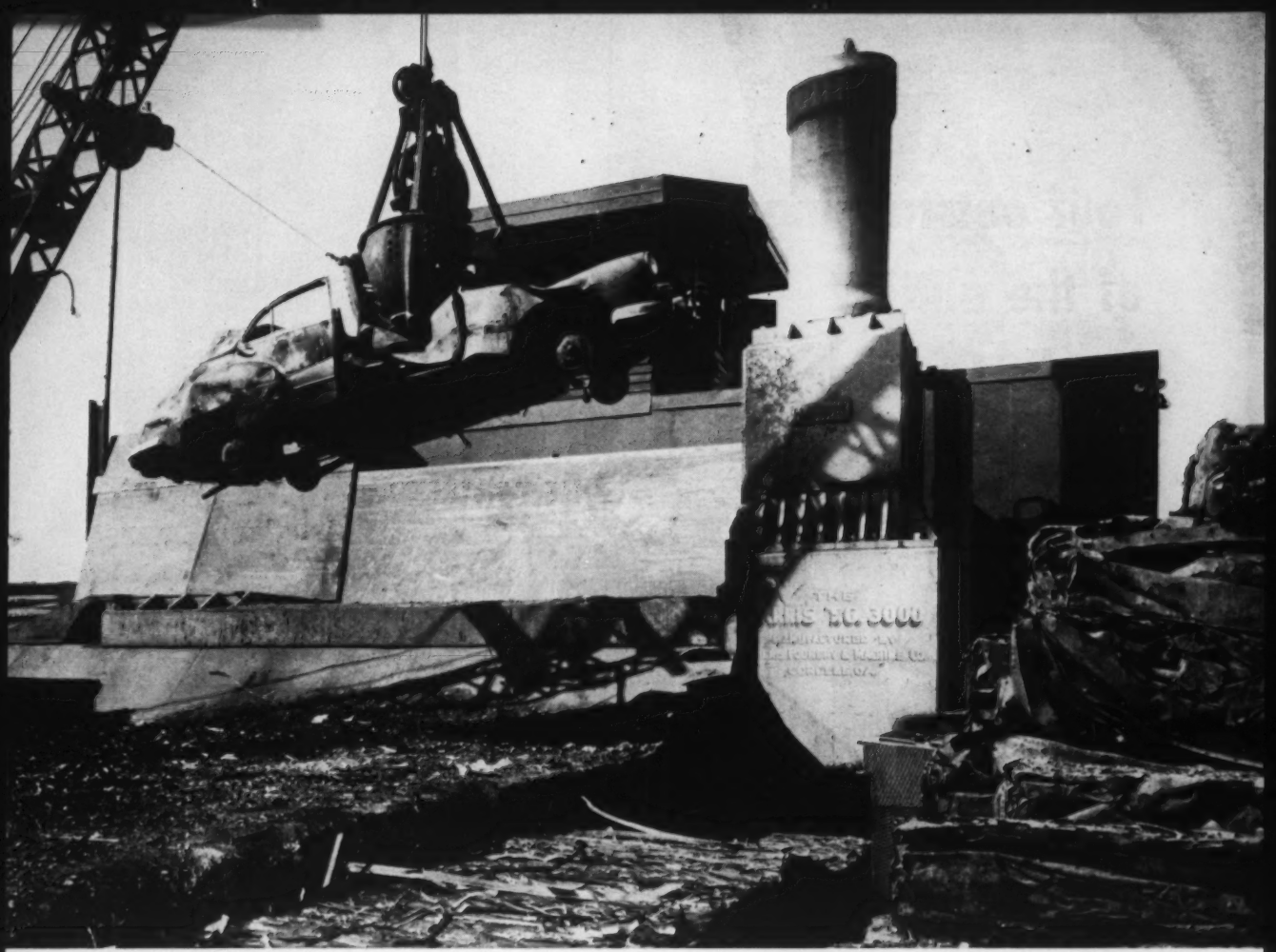
Sept. 17-20, Society of Mining Engineers of AIME: Froth Flotation Symposium sponsored by Minerals Beneficiation Division, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Division chairman: Neil Plummer, Magna, Utah.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn, Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

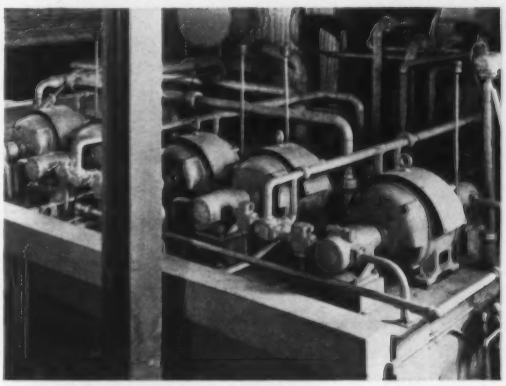


Smashing ¾ ton autos into 5 ft. bales

In a scrap salvage yard in Chicago, this huge press smashes automobiles into five-foot bales. Here's how it works. Stripped autos are shoved into a 20-foot press box. At the flip of a switch three giant plungers jam down with a force of over 1000 tons. Result: A compact bale, five feet long and two feet deep. About 30 cars an hour are run through this giant baling press.

Powering this mammoth machine requires sturdy motors. They have to deliver an instantaneous surge of power to drive home the huge plungers. Five Century Electric 100 hp motors do the job. Result: Plenty of dependable power when and where it's needed.

Century Electric application engineers have helped develop thousands of motor drive systems like this. And they can design the right drive system for your equipment because Century Electric designs, manufactures and applies motors and nothing but motors . . . your assurance of getting *more* than just a motor.



Five 100 hp Century Electric motors provide dependable muscle power for the huge press.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

59-9

Four outstanding advantages of the allNEW Landis Centerless Grinder

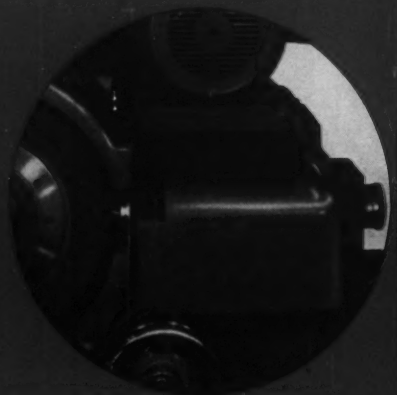
This completely new 12R machine is the finest centerless grinder available anywhere in the world. It will grind parts at a faster rate and to even closer tolerances than was possible before.

LANDIS

world leader in precision grinders

LANDIS TOOL COMPANY, WAYNESBORO, PA.

Faster grinding cycles with exclusive Landis Lockspeed regulating wheel drive.



New dressing accuracy . . . Landis Truform dresser gives exact duplication of the profile on the wheel.

Greater machine stability . . . surface plate ribbing of cast bed maintains perfect alignment of ways for both wheelheads.

Close tolerances . . . work rest solidly mounted on bed with support directly to the base for heavy stock removal.

Here's a man who's ready to help you with a roll problem But you don't need to have a roll problem to have a visit from Bill Curran, General Manager at National Roll. To the contrary, the "boss" spends a lot of his time with customers discussing their operations and roll requirements before problems have an opportunity to develop. This is typical of the personal interest National takes in helping customers get the benefits of maximum roll performance. For personal attention to *your* roll requirements, whether steel, iron or nodular iron, order from National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
General Steel Industries, Inc., General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

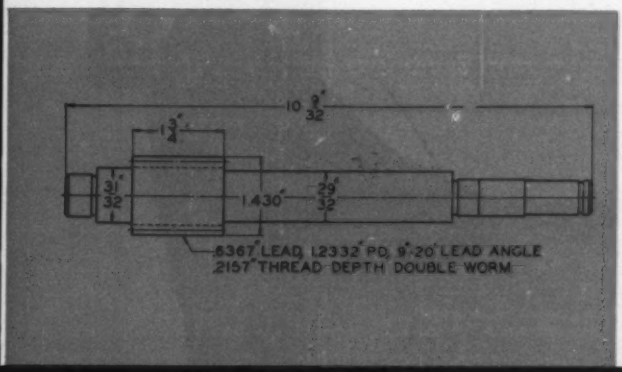
THREAD ROLLING

Shown here are five field installations in which the LANHYROL and LAN-NU-ROL Thread Rolling Machines have produced outstanding results and surpassed the highest of expectations. Production data from these representative jobs, shown on the opposite page, indicate the unequalled output, flexibility, and range coverage of these revolutionary machines.

Both Machines produce strong, accurate threads of excellent finish by the chipless, cold-forming process using four different Rolling Methods—Thrufeed, Infeed, Continuous and Reciprocal. The larger LANHYROL will thread all diameters from 0 to 3″ and the smaller LAN-NU-ROL 0 to 2″. Each Machine produces left- and right-hand threads of all types (except square), including UNC, UNF, Acme, Worm, and many special forms and is well adapted for automated processes. Soon to be announced will be the HY-DUTY Thread Rolling Machine. It will have a larger diametrical capacity than either the LANHYROL or LAN-NU-ROL. Watch for it soon.

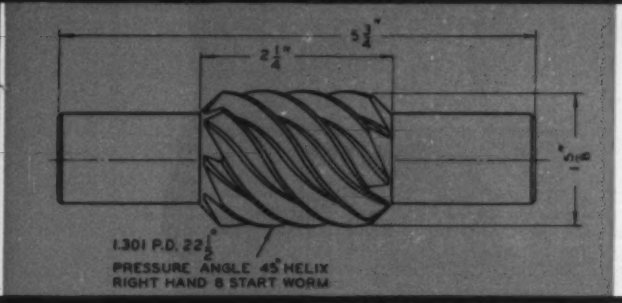
LANDIS *Machine* COMPANY
WAYNESBORO, PENNSYLVANIA
THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

601C



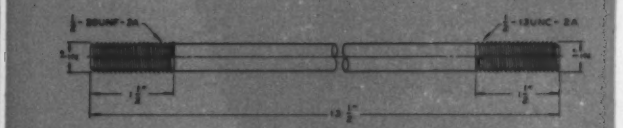
ROLLING INCREASES PRODUCTION FROM 4 TO 200 PER HOUR

Process—Infeed Rolling
Equipment—LANHYROL Thread Rolling Machine
Workpiece—Worm for an automotive-type differential for a riding lawnmower
Material—A.I.S.I. 8620 steel
Thread Specifications:
Diameter—1.430"
Length—1-3/4"
Type—.6367 lead, 1.2332" P.D., 9°-20' lead angle, .2157" thread depth, double worm
Production—200 pieces per hour (at 100% efficiency)



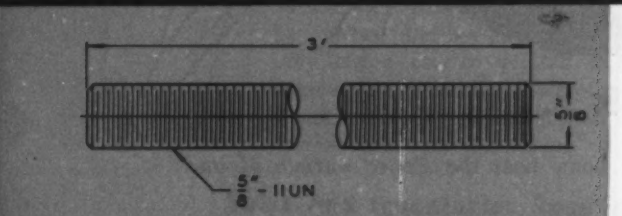
AUTOMATED ROLLING OF COARSE WORM PINION

Process—Reciprocal Rolling
Equipment—LANHYROL Thread Rolling Machine
Workpiece—Gear-reducer worm
Material—C1018 steel
Thread Specifications:
Diameter—1-5/8"
Length—2-1/4"
Type—8 start, 1.301" P.D., 22-1/2° pressure angle, 45° helix, right-hand worm
Production—180 pieces per hour (at 100% efficiency)



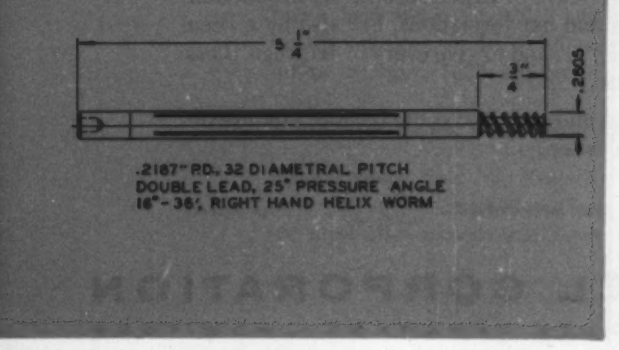
ROLLING DIFFERENT DIAMETER AND PITCH THREADS IN ONE PASS

Process—Continuous Thread Rolling
Equipment—"Extended Spindle" LANHYROL Thread Rolling Machine
Workpiece—Double-end stud
Material—8640 steel
Thread Specifications:
Diameter—1/2" (both ends)
Length—1-1/2" (both ends)
Type—20 pitch U.N.F. one end, 13 pitch U.N.C. on the opposite end
Tolerance—2A (both ends)
Production—103 pieces (both ends threaded) per minute (at 100% efficiency)



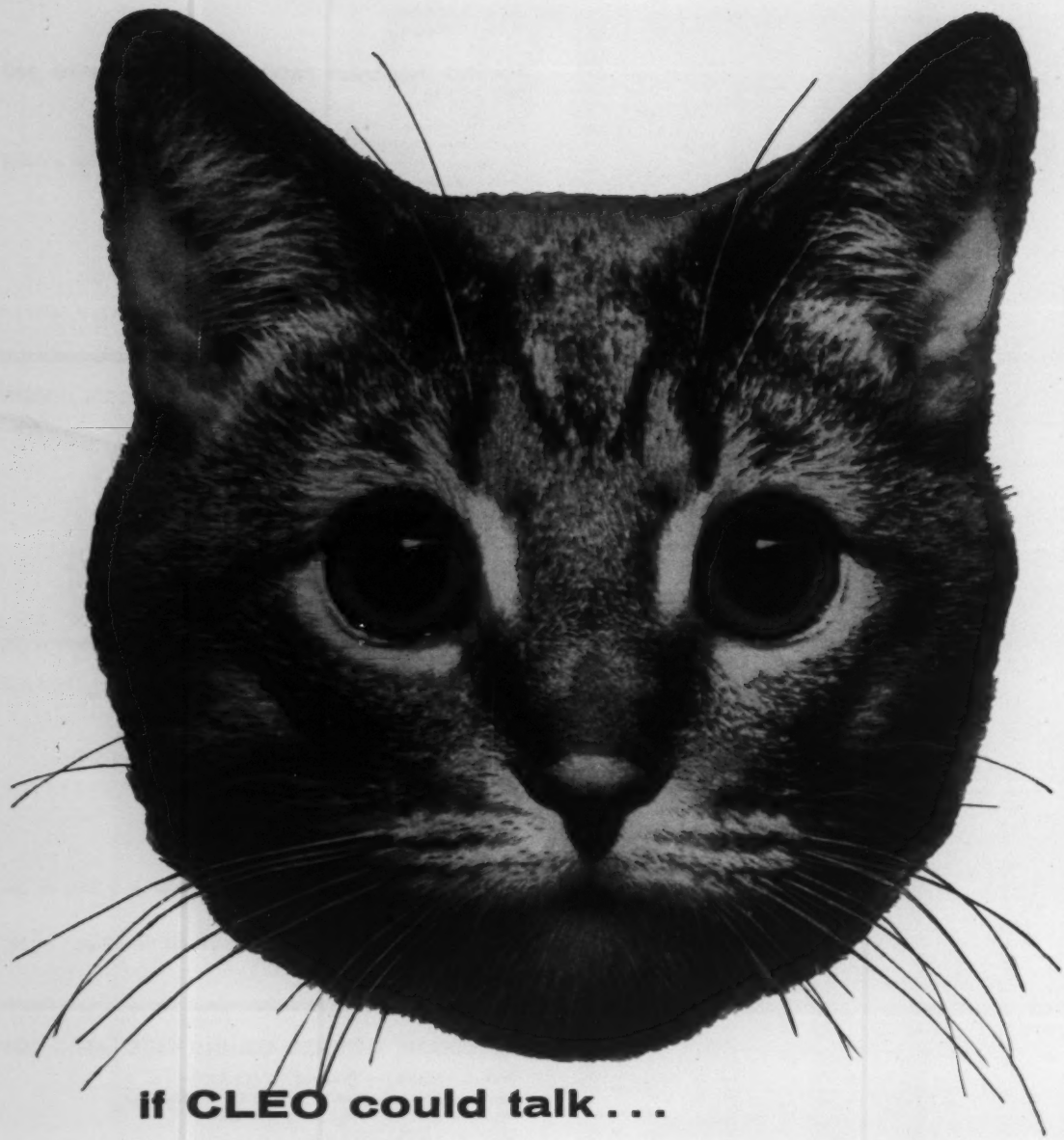
AUTOMATIC THRUFEED ROLLING CUTS LABOR COST

Process—Automatic Thrufeed Thread Rolling
Equipment—LAN-NU-ROL Thread Rolling Machine
Workpiece—Continuously-threaded bar
Material—A.I.S.I. 1018 steel
Thread Specifications:
Diameter—5/8"
Length—3'
Type—11 pitch UN
Production—216 inches per minute (at 100% efficiency)



LAN-NU-ROL PROVES IDEAL FOR SHORT-RUN WORM ROLLING OPERATION

Process—Infeed Rolling
Equipment—LAN-NU-ROL Thread Rolling Machine
Workpiece—Motor armature shaft for hand mixer
Material—A.I.S.I. C1040 steel
Thread Specifications:
Diameter—.2805"
Length—3/4"
Type—.2187" pitch diameter, 32 diametral pitch, double lead, 25° pressure angle, 16° 36', right-hand helix worm
Production—368 pieces per hour (at 100% efficiency)



if CLEO could talk . . .

This is Cleo, a cat who makes her home near the secure warmth of our billet furnace.

Cleo is an eye witness to almost every operation in our plant. Day and night, she sees the relentless effort of our "men of steel" to produce steel of quality . . . men who are qualified not only by years of experience in the production of high quality steel for cold heading and nut formations, but also by a keen CONSISTENT interest to maintain quality . . . and to give every order, regardless of quantity, the *same* special attention.

There are a number of sources for bars and rods, but if CLEO could talk to YOU . . . you'd call Seaway next time you order!

Ask us about a delivery date on your next order! NX 3-9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Invent for Profit Growth

"Too damn many people in business are trying to solve the wrong problems. They can't seem to differentiate between essentials and nonessentials. They emphasize the wrong things. That's why we have indiscriminate price cutting. That's why we have the profit squeeze. That's why we haven't come up with enough new products that really excite the buyer." So asserts Judson S. Sayre, chairman, Norge Div., Borg-Warner Corp., Chicago. For tips on how to excite the buyer, see Page 81.

Group Blames Steel Import Rise on Domestic Pricing

Steel imports rose from 1.5 per cent of total supply in 1957 to 6.1 per cent in 1959, then declined to 4.7 per cent last year. The rise resulted from the 1959 steel strike and from "high price policies which inevitably opened the door to competition from abroad, even from countries where basic costs are higher," asserts the U. S.-Japan Trade Council, Washington, in a new booklet.

Transparent Steel? Here It Is

Cynics have long needled the steel industry about producing a "see through" steel. Now Buckbee Mears Co., St. Paul, has done it. The firm produces "shadow masks" (photo) for color TV tubes. The steel for the masks is rolled to 0.006 in. by U. S. Steel Corp.'s American Steel & Wire Div. Then Buckbee Mears automatically etches exactly 441,222 perfect holes in the paper-thin piece of steel. Result: The TV Western hero can ride off into a colorful sunset.

Sales and Inventories Rose in May

Inventories of U. S. business firms rose by $100 million in May (after seasonal adjustment) to $91.3 billion. Inventories of durable goods manufacturers held steady at $30.2 billion. Total sales increased $1.2 billion, seasonally adjusted, to $61.7 billion in May. Sales of durable goods manufacturers increased $600 million to $30.7 billion.

U. S. Judge Says Workers Can Move with Plant

Federal Judge Fred W. Kaess has ruled that a Detroit company (Gemmer Mfg. Co., a division of Ross Gear & Tool Co.) planning to move to Tennessee must offer present employees jobs at the new location. The judge said

the Detroit employees' seniority rights survived as "earned and vested." He said that the vested rights of an employee apply to a "plant" regardless of its physical location and that these include seniority rights for rehiring after layoff. The judge noted that the UAW local might lose its rights to represent the workers, but that this would not affect the rights of individual workers.

New IBM System Acts as Reading Guide

International Business Machines Corp. has unveiled a new computer system to channel publications and other information selectively to the people in your firm who should receive it. Each bin in the document file (left) contains filmed images equal to about 3000 books. The viewing device (right) utilizes tiny film windows in punched cards, each of which contains four images of documents filed in a central store. The person using the system can obtain the full size document or use the viewer.

Construction: Up 4 Per Cent to New Record

Look for new construction expenditures to total $57.8 billion this year, up 4 per cent from last year to a new record. So says the Commerce Department. It lists these percentage changes in 1961 vs. 1960 . . .

All Private Construction	4	All Public Construction	10
Residential	*	Residential	12
Industrial	5	Educational	8
Commercial	5	Military	15
Farm	1	Highways	8
Public Utilities	5	Sewer & Water	9

*Change of less than 0.5 per cent.

How to Do Business with the Russians

The USSR may be a good market for you. Transactions are not too difficult to arrange and, although shrewd traders, the Soviets have a good reputation for prompt payment and compliance with contract terms. To make you aware of some of the essentials in trading with the Soviets, STEEL is presenting highlights from the book, *U. S.-Soviet Trade, Facts for the Businessman's Appraisal*, a study by eight Harvard graduate students (see Page 74). It gives an accurate picture of the problems, opportunities, and risks involved.

Shortage of Scientists Is Critical, Says Kennedy Aide

The nation is producing only about half the top level scientists it needs, Dr. Jerome B. Wiesner, President Kennedy's special assistant for science and technology told the Electronic Industries Association. He said the country needs 12,000 to 15,000 scientists yearly vs. the present output of 6000. He

estimated that national demand for engineers and scientists would be 2 million to 2.5 million by 1970.

Another Electric Auto Is Being Tested

The "Voltaram," an experimental electric auto built by Stuart Motors Inc., is being tested at Kalamazoo, Mich. The firm plans to introduce a four passenger electric car of more conventional design this fall.

Will Sun Cool Its Own Heat?

"Of all the possible uses of solar energy, the production of cold appears to be the most logical," contends Louis Lopez of the University of Florida's Mechanical Engineering Department. Obvious advantage: In summer, when the most cooling is required, the greatest amount of solar energy is available. Mr. Lopez says solar cells and thermoelectric refrigeration hold promise but the only possible system for use today is the absorption cycle.

Aluminum Siding Challenged by Composite

A home siding of plastic coated hardboard that looks like wood but eliminates the need for periodic painting is being developed by Masonite Corp. Expected to be ready "within two years," it will be priced competitively with aluminum siding. "Our product should be tougher than aluminum and able to withstand denting," asserts John M. Coates, president.

Diode for Simpler Computers

In a bid to simplify computer manufacture, Radio Corp. of America has introduced this multiple germanium switching diode. It consists of two or three advanced semiconductor diodes packaged as one integrated unit. So the number of components and connections in a computer can be reduced. And space can be saved. The units have a storage and operating temperature range of −85 to +185° F.

Commerce Studies Imports from U. S. Plants Abroad

Washington sources report that the Commerce Department has secretly surveyed 150 foreign subsidiaries of U. S. manufacturing companies to determine the effect of such foreign plants on the U. S. balance of payments and on American jobs. The study apparently will be of no help to protectionists. Our report says U. S. imports from the 150 subsidiaries totaled $328 million in 1959 and $213 million in 1960. But U. S. exports to those subsidiaries totaled $1.4 billion in 1959 and $1.6 billion in 1960.

Another Defense Spending Boost Being Studied

This week, the Defense Department hopes to complete another review of the nation's defense posture to determine whether we are spending enough in

STEEL The Metalworking Weekly

July 17, 1961 Vol. 149 No. 3

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view of the recent Russian air show and the problems in Berlin. At the Pentagon last week, indications were that there will be another boost—the third since President Kennedy's inauguration. The emphasis would likely be on conventional war equipment. The Pentagon still says it doesn't want to spend more for bombers, but Congress gave it $500 million more than it asked for. And there is considerable pressure from members of Congress to spend that money for B-52s, B-58s, and B-70s. The production lines for the B-52 and B-58 will shut down in September and October of 1962 unless more spending comes. On the B-70 program, both Congress and the Pentagon have O.K.'d a $1.3 billion program to produce four prototype bombers. The sentiment in Congress is to go ahead with a full B-70 production program, which would cost $2.7 billion.

Eddy Currents Find Broader Roles

Eddy currents have long been employed to locate hidden defects in metals. Now researchers report success with the method in measuring other physical properties —hardness, tensile strength, and microstructure. In fact, the method sometimes predicts sample failures after all standard tests have been passed. You'll find a progress report on eddy current testing beginning on Page 118.

Straws in the Wind

Volkswagen of America, Englewood Cliffs, N. J., reports the number of U. S. Volkswagen dealers increased by 7.5 per cent during the first half of this year, bringing the total to 612 . . . Sales of portable electric appliances will increase steadily in the coming six months, predicts R. J. Sargent, vice president, Westinghouse Electric Corp. . . . May shipments of mobile homes and travel trailers rose 21 per cent above the April level, reports the Mobile Homes Manufacturers Association . . . Federal District Judge Sylvester J. Ryan has granted the Kennedy administration's request for a Taft-Hartley Act injunction preventing resumption of the National Maritime Workers strike before Sept. 21. . . . May incoming orders rose about 25 per cent above the April level for members of the Material Handling Institute.

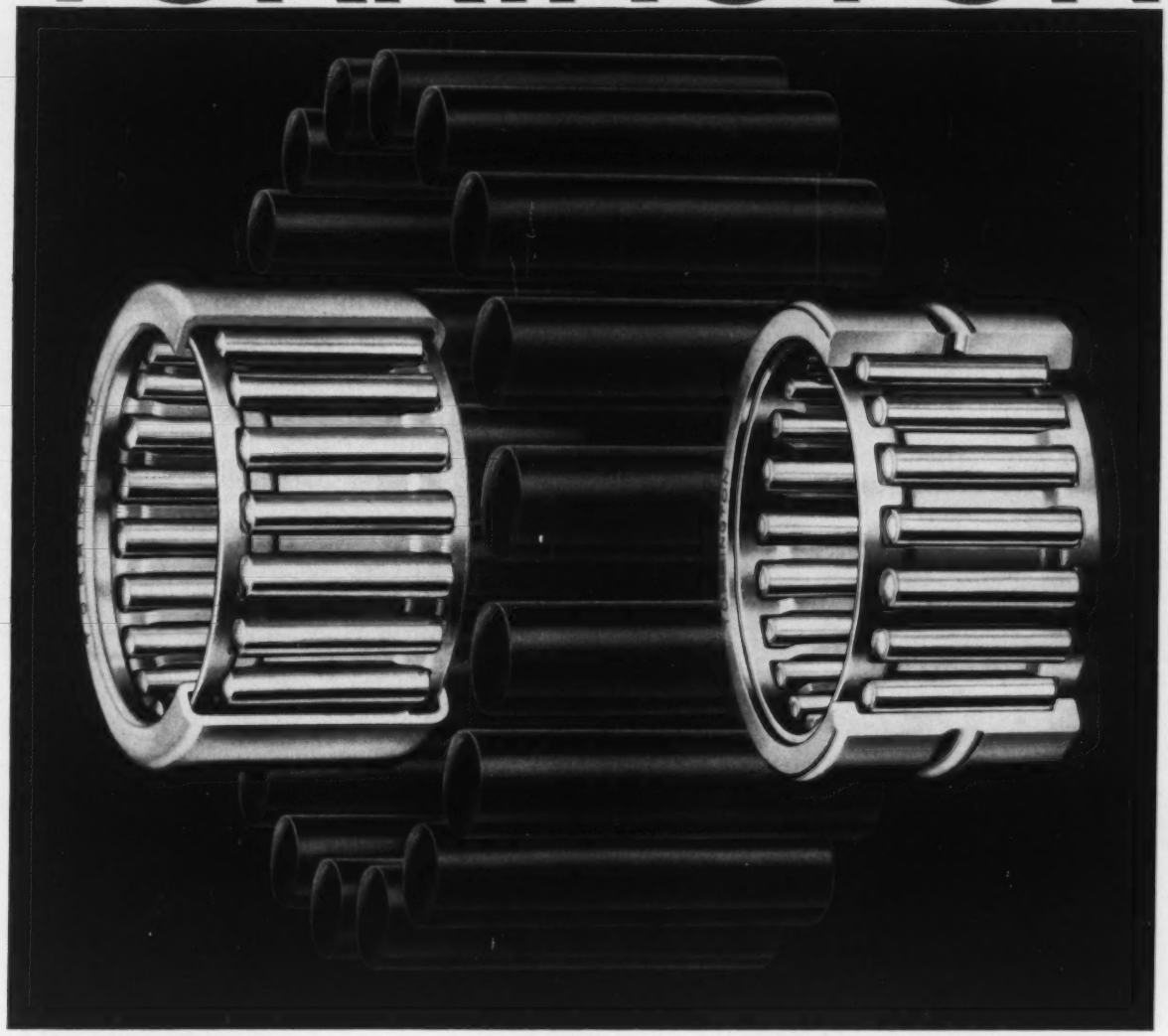
Metalworking Pulse

The Business Trend: STEEL's index of industrial production fell sharply in the week ended July 8 as most activity was halted over the July 4 holiday. **Autos:** Output in the week ended July 15 recovered from the Independence holiday cutback but failed to reach earlier marks as some lines began phasing out operations on 1961 models. **Steel:** Ingot production made a partial recovery from the holiday slowdown.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended July 8 . . . . . 147†
  Year ago 130
  Details on Page 91
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended July 15 . 110,000*
  Year ago 105,113
  Details on Page 88
- **STEEL INGOT OUTPUT (TONS)**
  Week ended July 15 1,850,000*
  Week ago 1,779,000
  Details on Page 160

†Preliminary. *Estimated.

TORRINGTON



WHATEVER THE DUTY...TORRINGTON HAS A BEARING FOR IT

Take these two bearings:

The unique Torrington Drawn Cup Roller Bearing opens new design possibilities in alternators, power-tool motors, electric mixers, vacuum cleaners and a host of similar products. It is so light, compact and efficient that designers have more flexibility than ever before. Yet the Drawn Cup Roller Bearing costs less than any other anti-friction bearing of comparable performance. In many cases, armature bearing costs have been reduced as much as 50%.

The Torrington Heavy Duty Roller Bearing is ready when the going is tougher. Controlled Contour rollers insure uniform loading and prevent stress concentration at the roller ends. A patented flange-riding retainer insures positive roller guidance and provides ample lubricant storage area. Torrington Heavy Duty Roller Bearings have proved highly successful in two-cycle engines, hydraulic pumps, oil-field equipment and transmission systems.

These are just two examples of Torrington's outstanding capability in bearing design and manufacture. Remember that Torrington makes **every** basic type of anti-friction bearing . . . can supply the bearing that's **exactly** right for your application. Don't hesitate to call us for advice.

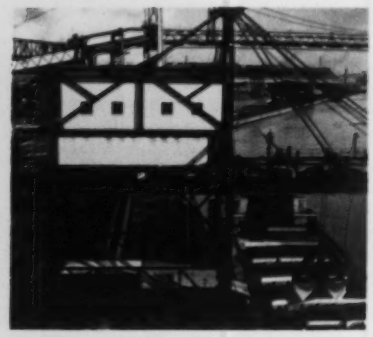
progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY Torrington, Connecticut • South Bend 21, Indiana

How Dravo serves the steel industry

MATERIALS HANDLING EQUIPMENT

New 1650-ton-per-hour unloader and a companion ore bridge rated at 1360 tph speed ore handling for midwest steel producer. Check the coupon at right for details on Dravo bulk materials handling equipment for mills, plants or docks.

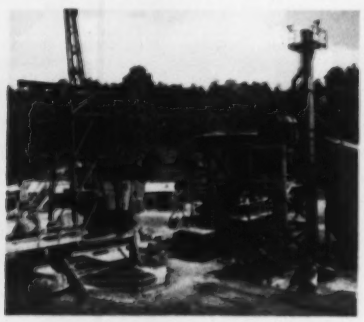


ORE PROCESSING

Over 45% of sinter capacity added by U.S. steel industry in last 5 years has been furnished by Dravo—including this 2400-ton-per-day plant. Check and mail coupon to obtain more information on sintering, briquetting, pelletizing and ore beneficiating plants.

SPECIAL CONSTRUCTION

Head frame (left foreground of photo) sits astride 575-ft. concrete-lined ventilating shaft at a steel company mine. Construction of shafts, slopes, tunnels, docks and harbors are part of Dravo's half century of experience in special construction. Mail coupon for information.



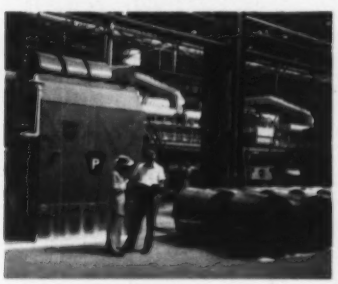
Dravo furnished ore unloader, ore bridge and sinter plant for this midwestern steel producer.

PLANT UTILITIES

When completed, this modern intake and pumping station will handle up to 30 million gallons of water daily. Such Dravo turn-key projects include oxygen, power and boiler plants, compressor stations, other special utility and plant facilities. Mail coupon for information.

SPACE HEATING

One of 60 Dravo space heaters which supply comfort heating in this large strip mill. Over 20,000 units (¼ to 3 million btu) are in use throughout industry for all types of manufacturing and warehousing structures. Check and mail coupon for details.



Dravo Corporation, 4751 Grand Avenue, Pittsburgh 25, Pa.

Please send me information on the following products and services

☐ Oxygen Steel-making	☐ Ore Bridges	☐ Docks, Harbors
☐ Oxygen Plants	☐ Towboats	☐ Water Intakes
☐ Mill Lubrication	☐ Barges	☐ Shafts, Tunnels
☐ Sinter Plants & Coolers	☐ Briquetting	☐ Space Heaters
☐ Ore Beneficiation	☐ Pelletizing	☐ Container Cranes
☐ Ore & Coal Unloaders	☐ Grating	☐ Fabricated Piping

Name _____ Title _____

Company _____

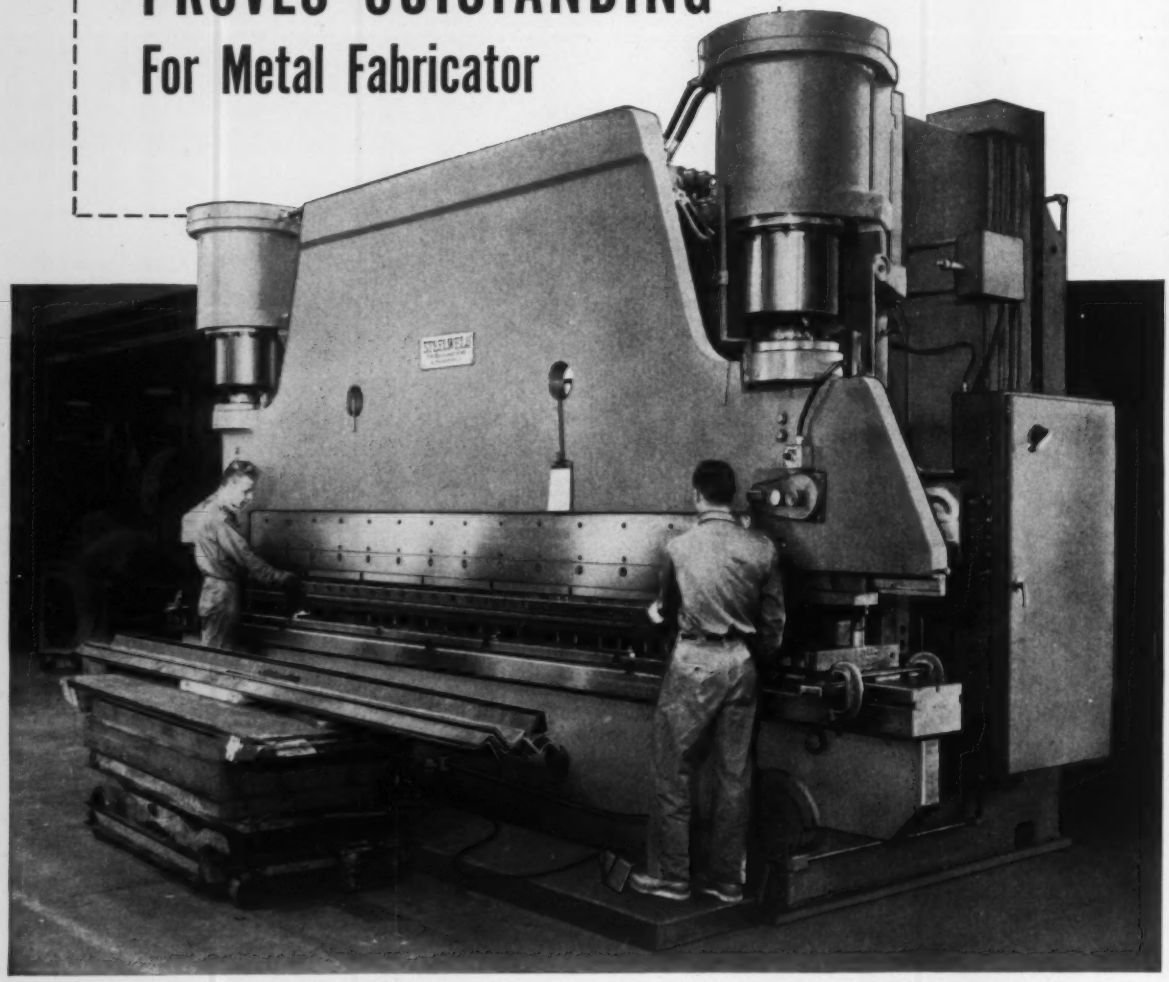
Address _____

City _____ Zone _____ State _____

DRAVO

Hydraulic Press Brake PROVES OUTSTANDING For Metal Fabricator

Model MH16-14 Steelweld Hydraulic Press Brake. Overall bed and ram length 20′-0″. Capacity 650 tons.



A 650 ton Steelweld Hydraulic Press Brake is a mighty important tool at The Bargar Metal Fabricating Co., Cleveland. It performs a wide range of operations such as bending, forming, stamping, punching, drawing.

The brake is especially good for bending large plates, because the ram can be traveled at exactly the right speed to prevent whipping of the plate. Sometimes plates as large as 10′ x 20′ x ¼″ are bent.

The machine is very useful for drawing operations, excelling mechanical press brakes for this work, because it can be operated at the speed that is most suitable for the metal. Also, the ram can be traveled through a greater distance because of the unusually long 16-inch stroke. The power is constant for the entire stroke.

Much punching is done with the Steelweld, and this work is speeded by adjusting the ram stroke to travel only slightly more than the thickness of the plate. The fact that the ram can be inched to the work and backed away whenever desired is another time-saving feature especially helpful when setting up dies.

The Bargar Company has one of the finest and most completely equipped sheet metal fabricating plants in Cleveland. The Steelweld Brake is a good example of their modern production facilities.

Write for free booklet No. 2024

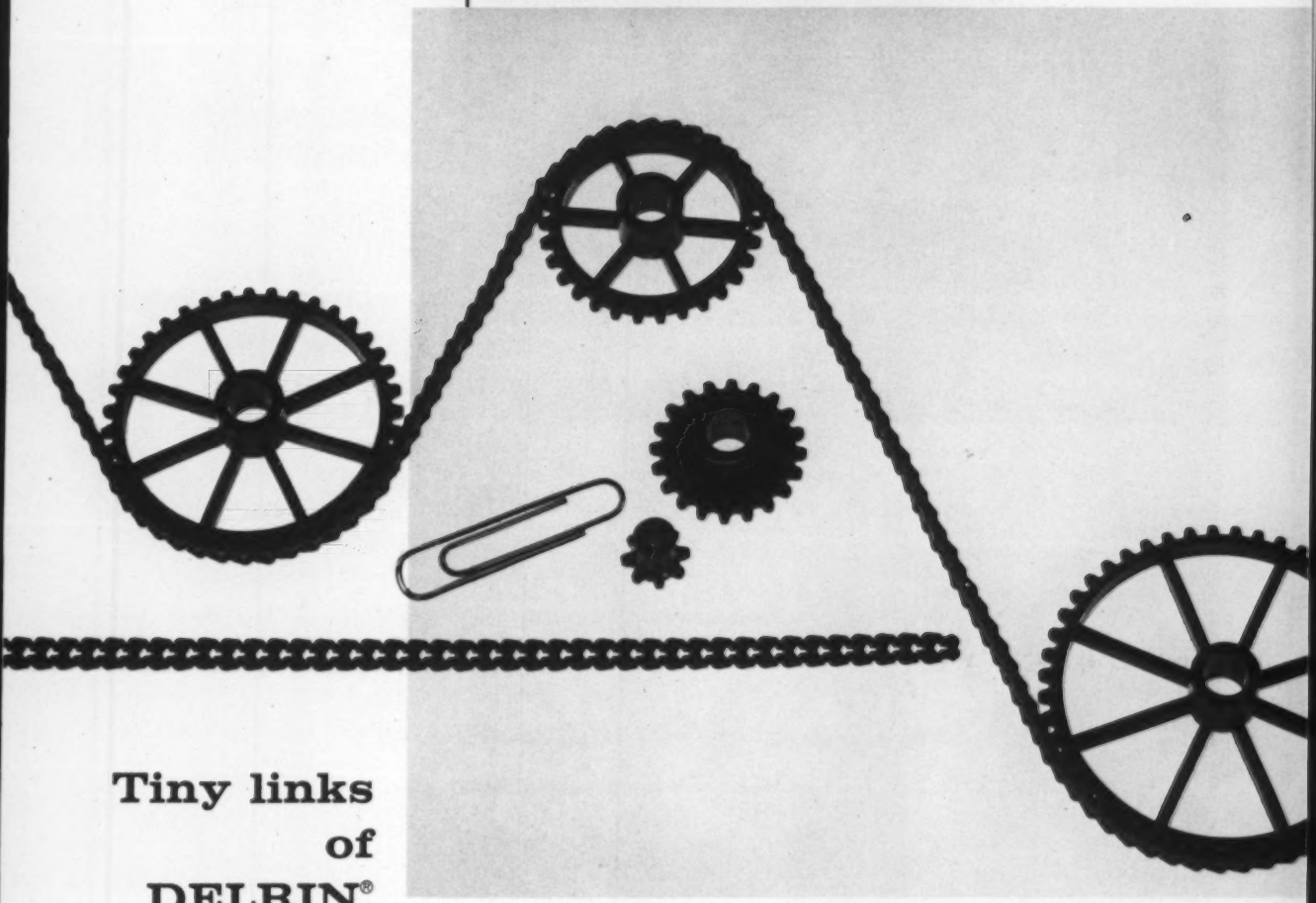
STEELWELD
MECHANICAL and HYDRAULIC
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7882 E. 281 ST. • WICKLIFFE, OHIO

working with Du Pont **Delrin**

one of Du Pont's versatile engineering materials



Tiny links of DELRIN® make a remarkable miniature chain

These miniature chains and sprockets are significant examples of the way Du Pont DELRIN acetal resin provides superior performance in application areas once reserved for metals. The chain of snap-fit links is made possible by the strength, stiffness and resilience of DELRIN. The need for a master link is, therefore, eliminated, making the chain adjustable in ⅛ inch increments. The chain weighs only 1 oz. per 15 ft.—one-fifth the weight of similar steel chain. It is factory-tested; momentary tension load at 7 lbs.; and running loads to 2 lbs. Manufacturer's service-life tests show a work rate transfer of 0.06 HP for 10 hours . . . 50 foot-tons of work per inch of chain. The chain is solvent-resistant, prelubricated, non-magnetic and non-conductive. These drive components were designed to fill a need in miniature mechanics and instrumentation in a wide variety of high-speed, low-inertia mechanisms.

The manufacturer, Bohannon Industries of Colorado Springs, Col., reports that of the many materials tested, only DELRIN was adaptable to the intricate technology involved in the development of these miniature drive components.

The unique combination of properties offered by DELRIN solve a variety of design problems in areas as diverse as automobile handles and electronic switches. On the reverse side, you will find additional examples of product improvements made possible by this versatile material.

DU PONT

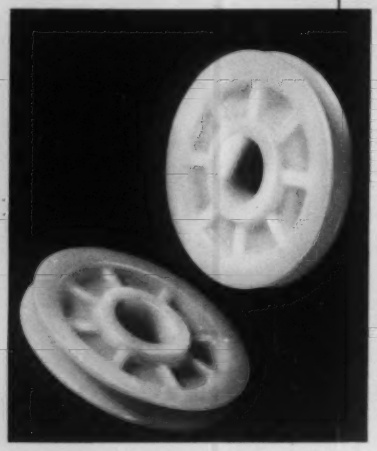
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

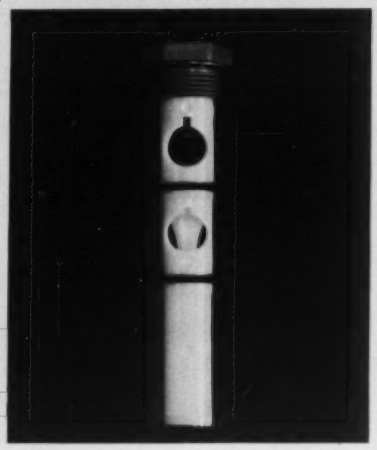
working with

Du Pont Delrin

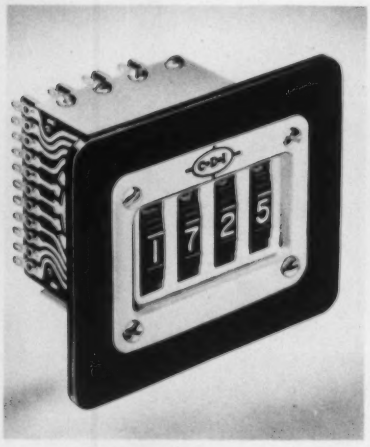
one of Du Pont's versatile engineering materials



Long-wearing parking-brake cable pulleys of DELRIN® are being used by a leading car manufacturer. The full-radius groove in DELRIN provides natural mating, maximum contact area with the cable . . . eliminates the cable pinching caused by split-type steel pulleys. The new pulleys molded of DELRIN have been tested under severe long-term conditions of high load and temperatures.



Jet injector unit for shallow-well system is molded in three parts of DELRIN and joined by two "one-direction" snap-fits, giving permanent assembly. The new unit outwears bronze by a factor of 2 under sand abrasion . . . molded threads utilize high shear strength of DELRIN acetal resin. (Molded by American Molding Company, San Leandro, for Jacuzzi Bros., Inc., Richmond, California.)



Thumbwheel of this unique multi-deck rotary switch is molded of tough, abrasion-resistant Du Pont DELRIN. A single ¼ inch thumbwheel of DELRIN provides the mechanical and electrical insulating properties needed to handle a combination of rotary switches. (Molded by Par-A-Mount Tool & Mfg. Co., Inc., Chesterton, Indiana, for Chicago Dynamic Industries, Precision Products Division, Chicago, Ill.)

DELRIN® has the strength and toughness to meet rugged mechanical requirements

When a part must function reliably under rugged usage, the strength, stiffness and toughness of DELRIN acetal resin may well provide an economical solution. Parts molded of DELRIN retain a high degree of their mechanical properties under numerous conditions, including broad temperature ranges (–40°F. to 250°F.), humidity, solvents and stress.

Already, many hundreds of designs taking advantage of the unique properties of DELRIN, and of the cost savings made possible by rapid injection molding, have been put into commercial production. Why not investigate further with a view to your own products and problems? Mail the coupon below for more information.

POLYCHEMICALS DEPARTMENT

DU PONT

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), Dept. 2
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B
C
D
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F

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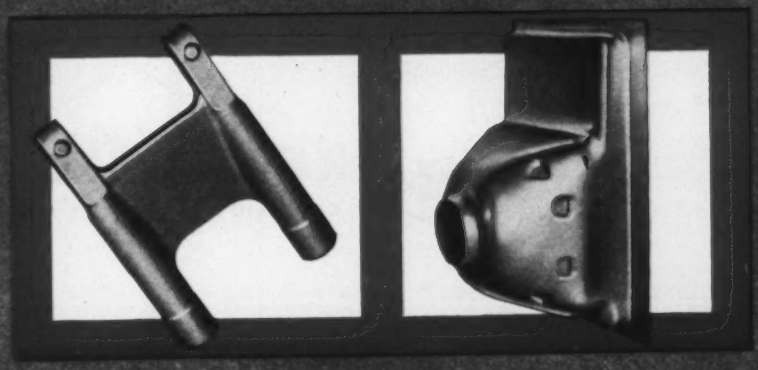
DELRIN® *acetal resins*

Alathon® · Zytel® · Lucite®

FORGINGS

TRANSUE & WILLIAMS

STAMPINGS



From aircraft and missile forgings, to deep drawn stainless fat fryer tanks, are but a few examples of the wide range of the many components produced for all types of industry by T & W.

Because T & W engineering and production facilities are versatile, your requirements receive *specialized T & W treatment* designed to find better ways to reduce cost and improve quality. *To learn how T & W can help you, call or send us a print.*

in forgings: **Sizes:** 1 ounce to 500 pounds. **Materials:** Carbon and Alloy Steel, Non Ferrous and Stainless, Pure Molybdenum, Titanium and High Temperature Alloys (Plain or Heat Treated).

in stampings: **Sizes:** 3 inches by 3 inches to 60 inches long, 40 inches wide and 16 inches in drawn depth. **Materials:** Steel, Stainless and Aluminum. (Blanking, forming, welding, sub and final assemblies).

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ALLIANCE, OHIO

SALES OFFICES: Philadelphia, Old Saybrook (Conn.), Chicago, Detroit, Dallas, Los Angeles

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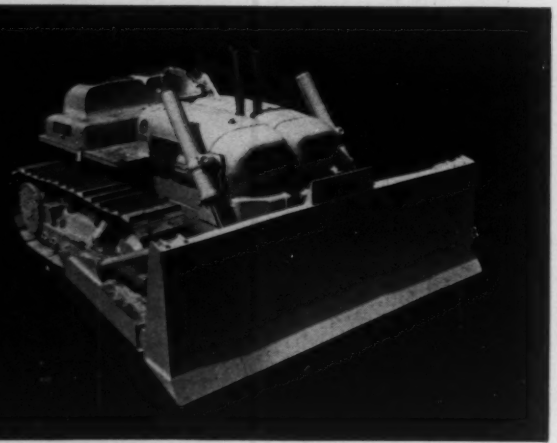
To help cut costs, improve your product quality, meet close-tolerance design requirements . . . you can count on Republic.

Republic . . . where diversified capabilities, modern facilities, and engineering know-how all add up to one important fact: Republic produces the world's widest range of standard steels and steel products. *Steels and products to exactly match your job requirements.*

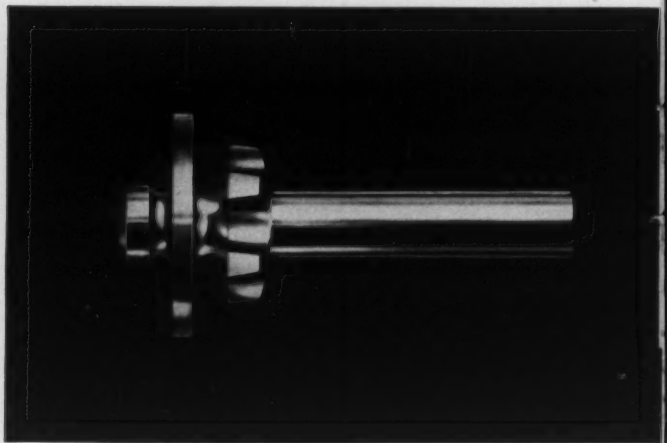
And to help you in the selection of the best, lowest cost material for your requirements, specialists from each Republic Division (metallurgists, engineers, designers) are at your service to work with you and your staff. It's an obligation-free service of

REPUBLIC STEEL

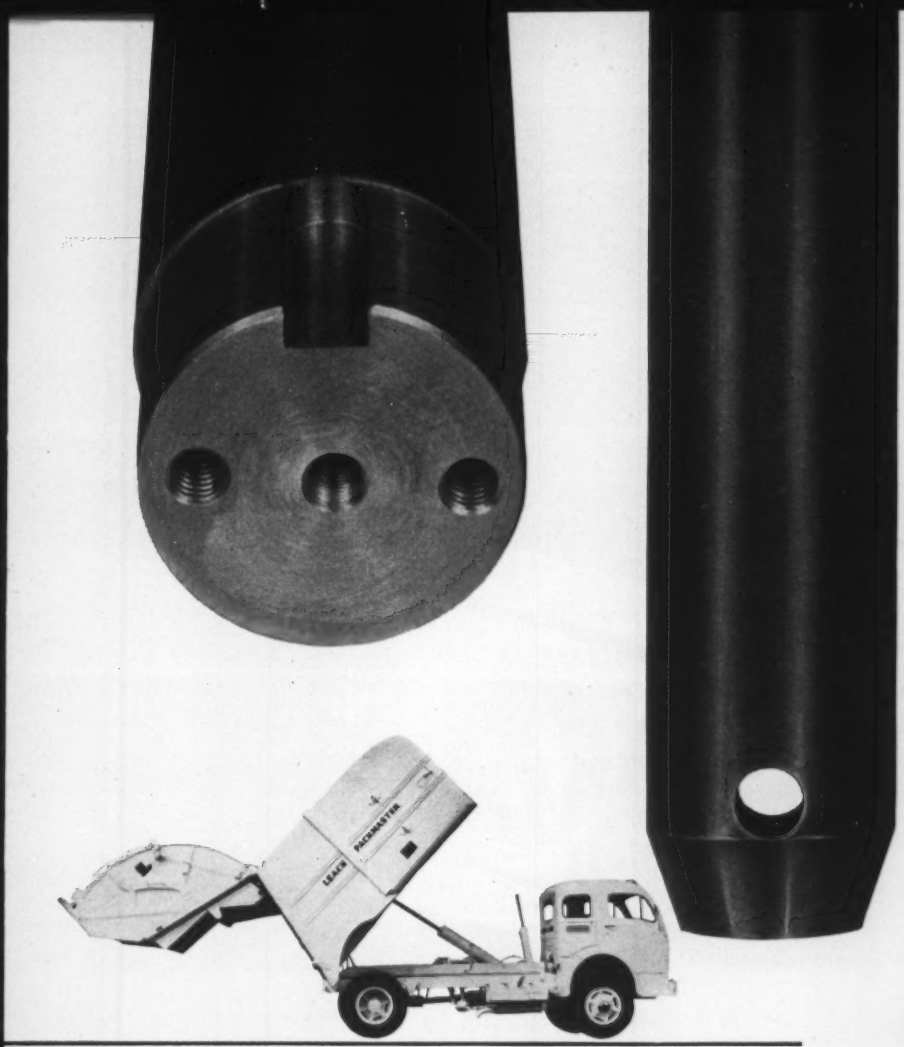
REPUBLIC HAS THE FEEL FOR MODERN STEEL



SPECIAL SECTIONS for a dozer. Uniformly high impact- and wear-resistance are musts for grader and bulldozer blades. Bucyrus Blades, Inc., Bucyrus, Ohio, found this combination in a special analysis Republic Hot Rolled Steel. Costs are rock bottom, too, because the steel is Republic-rolled into special sections that trim finishing and forming costs for Bucyrus. Check into Republic Special Sections for your product by mailing the attached coupon.



STAINLESS to beat corrosion and wear. In the manufacture of Hyseal Valve Stems for American-Standard single lever mixing faucets, National Acme Co., Cleveland, required steel with high corrosion- and wear-resistance, plus easy machinability. Material selection: Republic Cold Finished Stainless Steel Bars—Type 303. Completed in a single setup, the 10 machining operations—including multiple end drilling of six holes on a 15° angle—are performed in 12 seconds. Send coupon for information on Republic Stainless for your job requirements.



COLD FINISHED ALLOY BARS form high strength pins. The full weight (up to 5 tons on larger units) of the Packmaster body and its refuse load, rests on steel pins at the pivot points when the unit is hoisted to unload. Republic Cold Finished Alloy Bars, cut off, drilled, and chamfered by the Packmaster Manufacturer, Leach Co., Oskosh, Wisconsin, offer the toughness and abrasion resistance needed for this application. Investigate the advantages of using Republic Cold Finished Alloy Bars for your component parts production by sending the coupon below.

Steel

Strong,
Modern,
Dependable

ELECTRUNITE Mechanical Tubing to meet close tolerances. Automatic pinsetters—product of Brunswick Corporation—are precision-engineered, rugged mechanical units. Republic ELECTRUNITE Tubing was specified for use in three key locations because it met the extreme tolerance requirements; reduced weight without sacrificing strength; and is delivered ready for fabrication, saving production time and costs. Send for data on the complete selection of ELECTRUNITE sizes, gages, and wall thicknesses.

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Please send more information on:
- ☐ Republic Special Sections
- ☐ ELECTRUNITE® Mechanical Tubing
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Name_____ Title_____

Company_____

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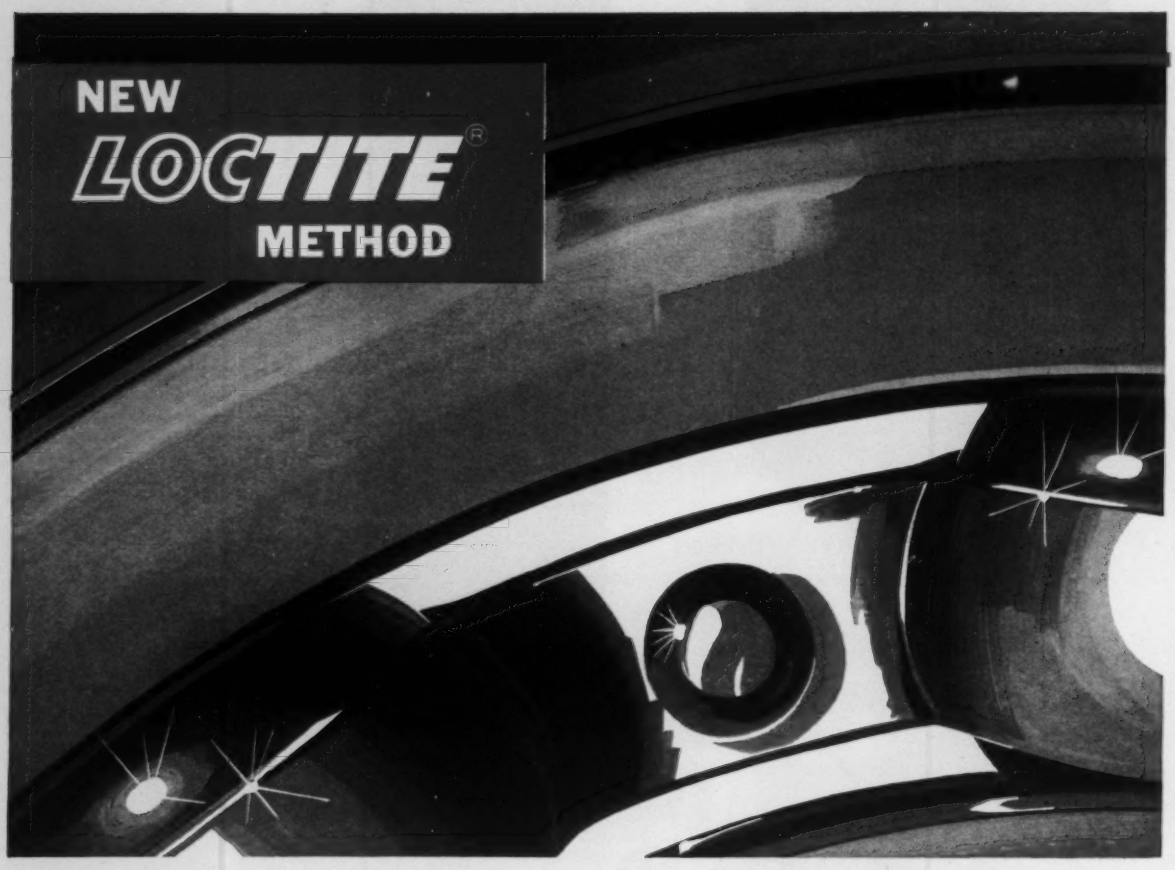


IMPROVES RELIABILITY OF PRESS FITS . . . CUTS COSTS
. . . without A Penny Invested in Equipment!

Simply apply a few drops of LOCTITE Sealant to press fit assemblies. Look at these production assembly advantages:

- Greatly increases reliability of interference fits and other methods of metal-to-metal assembly.
- Requires no expensive equipment—the plastic bottle is the applicator. Can be used for automatic or mass application with simple "around-the-shop" parts.
- Increases allowable tolerances—reduces machining costs.
- Reduces materials costs—minimizes design requirements.
- Facilitates assembly of delicate parts—reduces danger of deformation.
- Facilitates proper concentric fit of mated parts in line-to-line fits—this liquid-turned-to-solid mates parts better than any metal-to-metal contact possible.

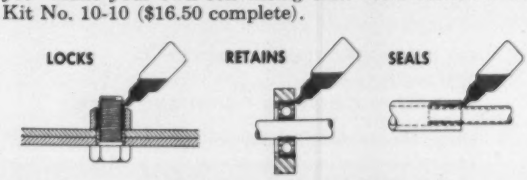
. . . and parts can be disassembled with standard tools and techniques.

WHAT IS LOCTITE? LOCTITE Sealant is a penetrating liquid resin with low viscosity that hardens when confined between closely fitted metal surfaces. It "wicks in" between the most closely mated of matched precision surfaces and hardens into a strong, heat-, oil-, grease-, solvent- and vibration-resistant bond. LOCTITE completely fills the space between the surfaces . . . adds its sheer strength to that of the press fit. There are no solvents to evaporate —no catalyst to mix.

On the production assembly line and in other areas, too, the LOCTITE Method replaces and improves many different mechanical means of *locking—retaining—sealing*. LOCTITE Sealant has already brought these benefits and savings to such leading companies as:

Bendix Corporation
Consolidated Diesel Electric Corp.
The Maytag Company
Westinghouse Electric Corp.
General Dynamics Corporation, Electric Boat Division
Reeves Instrument Corporation
Norge Division, Borg-Warner
Remington Rand Univac
Philco Corp.—Government & Industrial Div.
General Electric Company
Raytheon Mfg. Co.
McDonnell Aircraft Corporation
Veeder Root, Inc.

Details on your particular application bring immediate response from our Application Engineering Dept. Or, better yet—make your own convincing test. Mail check for Test Kit No. 10-10 ($16.50 complete).



LOCTITE® SEALANT

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"Runs quiet and cool"

. . . because this Gardner-Denver air-cooled compressor is installed complete with aftercooler and silencer. Provides dependable, low-cost air power . . . is ideal for departmental or auxiliary air power. Runs for years with just routine attention. Choose from a complete air-cooled line. Write for bulletin.

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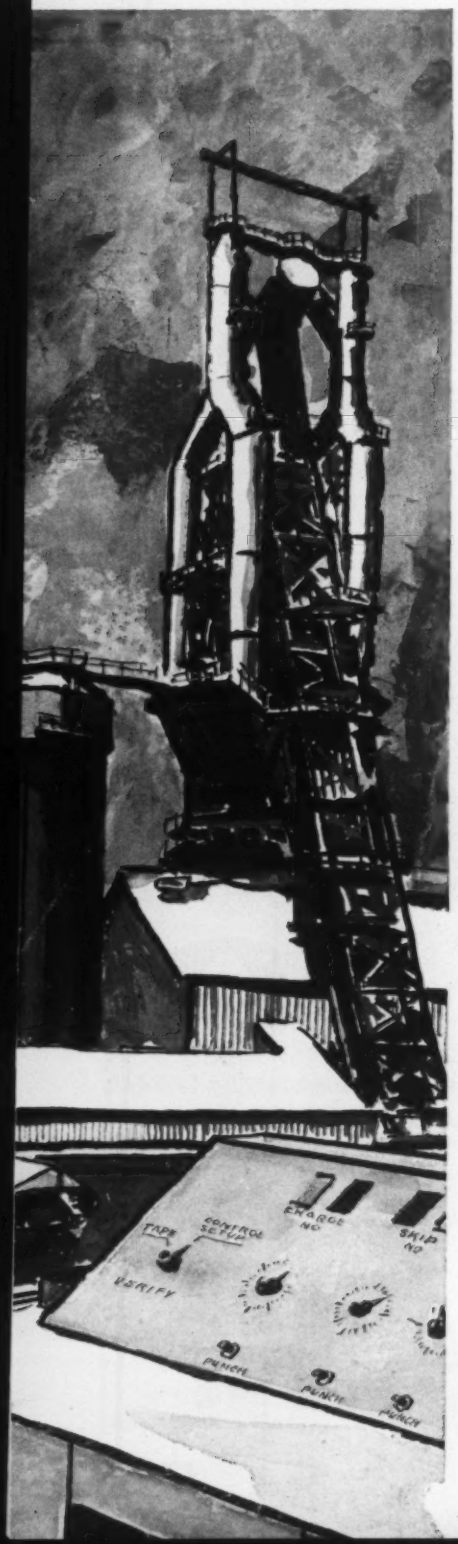
FOR QUALITY... PRODUCTIVITY... PROFIT

BLAST FURNACES
AUTOMATED BY GENERAL ELECTRIC

Take "guesswork" out with General Electric

of charging; get increased iron output automated blast-furnace control system



Charge your blast furnace with exact amounts of materials in proper sequence at the desired time with new General Electric control. G.E.'s blast-furnace control automatically charges ore, coke, and stone on demand from the furnace according to predetermined selections set into the operator's control panel. Accuracy of this control permits 100 percent utilization of charging equipment for extended periods. You operate equipment with only the necessary capacity to supply desired furnace output. There's no need for extra capacity to compensate for operator fatigue or inability to meet furnace requirements with manual operation of the complex stockhouse. You increase furnace output with less investment.

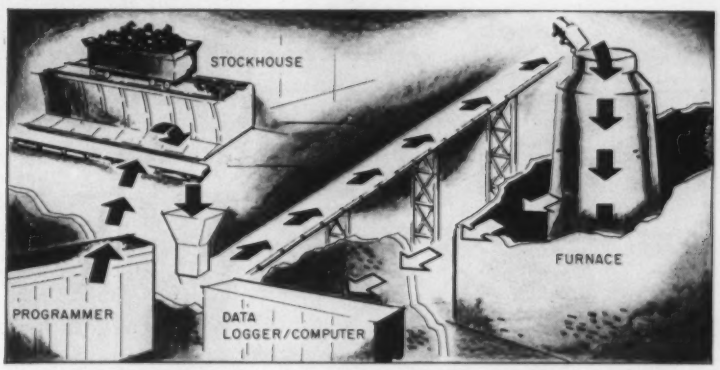
The entire charging operation is sequenced and interlocked to maintain desired furnace output, from material selection in the stock bins to the time the iron is tapped. To obtain desired iron quality, the operator selects only the necessary transfer switches, pushbuttons, and dials for sequence, type and amount of materials. The automated control takes it from there. General Electric's *DIRECTO-MATIC** control is the "mind" of the system, activating every charging step in proper sequence. Indicating lights on the panel keep the operator informed of every phase.

This new charging system reflects General Electric's continued control leadership for the steel industry for over 75 years. Let your General Electric sales representative work with you in automating your blast furnace, or in planning complete electrical systems for any process control. Or, write Section 785-18, General Electric Co., Schenectady 5, N. Y. *Industry Control Dept., Salem, Va.*

* Trade-mark of General Electric Company.

Progress Is Our Most Important Product

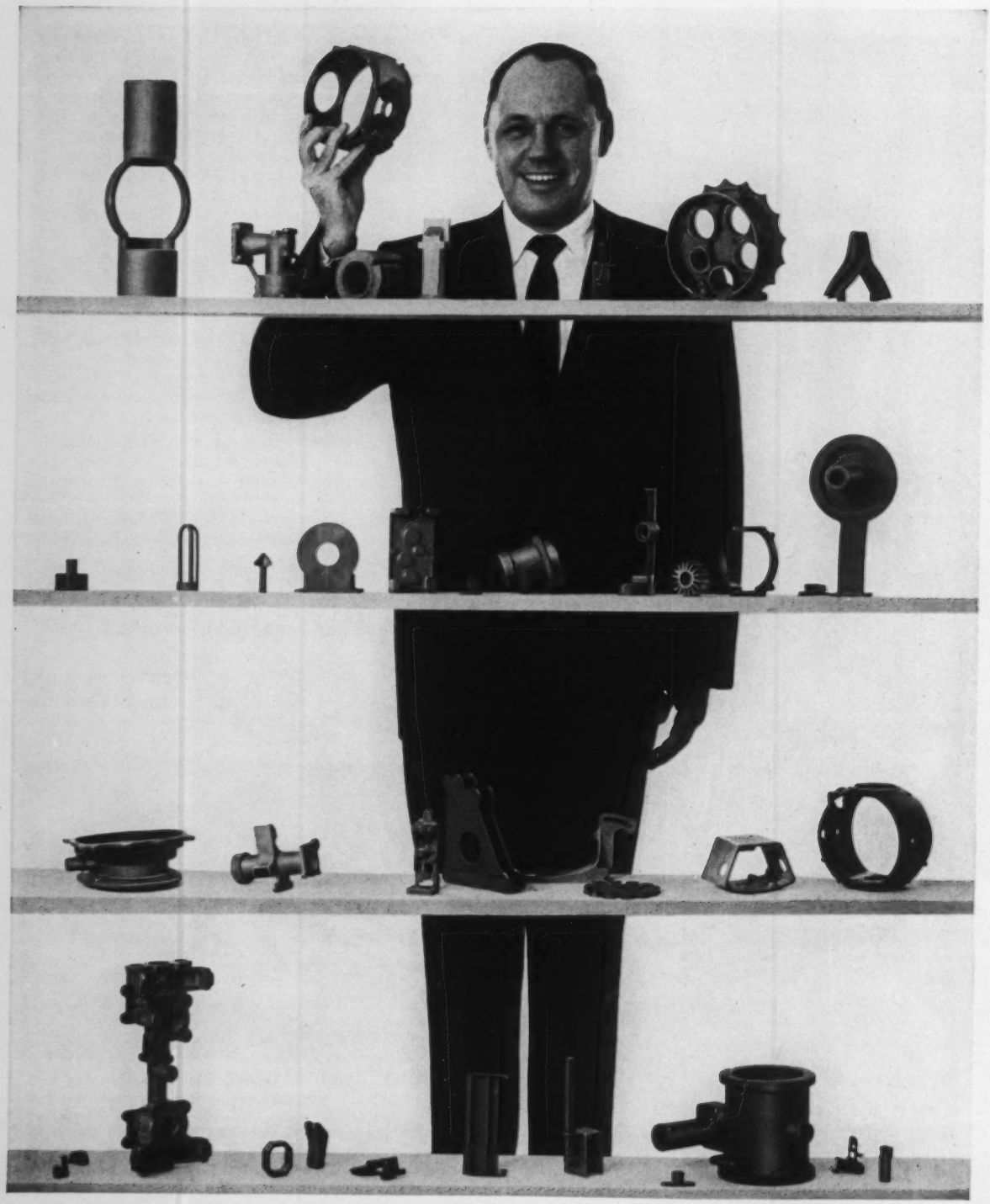
GENERAL ELECTRIC



A DATA LOGGER/COMPUTER, added to General Electric's charging control, can accumulate feedback on temperatures, pressures, and chemical analyses of burden during operation (white arrows). Following laboratory study, furnace operations based on this data can be set into the computer and the simulated results typed out. If the computer indicates desired output, the operation can be set into the programmer and experimentally run through the furnace (black arrows). Ultimately, the data logger/computer and programmer can be connected for complete automatic control of the entire furnace operation.

Because we've always

WE'VE BECOME THE BIGGEST IN



welcomed "little" jobs, too–

THE INVESTMENT CASTING FIELD...

...and it makes good sense both for Arwood and its customers

No investment casting job has ever been or ever will be too small for us.

We don't have any "sidelines" nor is investment casting only a sideline with us. It is the "be-all and end-all" of our economic existence.

AS A RESULT: anybody–and we mean precisely that–*anybody* who suspects, thinks, feels or believes that an investment casting will help him solve a design or production problem gets the unqualified, undivided attention of the top talent we have to offer–from the trained field engineer in his territory, our design engineers, our estimating staff, our tooling men, and our production specialists. No one of these groups cares whether your order is for 50 parts or 100,000. If they accept the order, they want it handled to or above "specs"–preferably above.

Why? Simply because these men are dedicated to producing the finest that the investment casting process can deliver in any design, in any castable alloy (we cast any that can be), and in prototype quantities so small that it might surprise you.

This attitude of theirs is far from philanthropic. From an accountant's eye view, they realize full well that your "little ones" may soon grow up and become big ones.

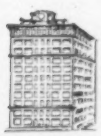
And when they do, Arwood is ready . . . more so than any other investment caster. In fact, we can take in stride all the volume that's required. Our five plants, extending from coast to coast, each with its own research, tooling, quality control and production facilities, can handle the biggest job you can offer.

In short, once the prototype or experimental phase is completed, Arwood can give you the quantity production you need, *and* deliver it when you need it.

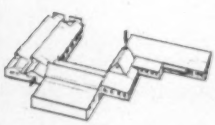
What more can we say? We can only sum it up by saying this – If you have a "difficult" part remember this: most "difficult" components, no matter what the alloy or quantity, might well be produced as an Arwood investment casting . . . and the cost is often extremely low, compared with conventional methods.

On the other hand, if we can't do it–and do it economically – we'll be the first to tell you so – immediately. We'd rather lose an order than a customer. As you can count on Arwood, you can count on that. Try us and see.

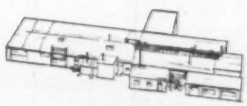
ARE YOU *REALLY* UP-TO-DATE ON WHAT INVESTMENT CASTING CAN DO? A lot of over-optimistic information has been disseminated in the past. Our 48-page "Practical Guide" gives forthright answers on what to expect, and, equally important, what *not* to expect. It tells how to save money by designing for the process, and also gives complete tables on the properties of castable alloys. It's yours for the asking.



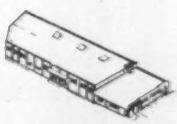
BROOKLYN



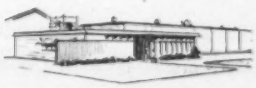
TILTON



GROTON



LOS ANGELES



LA VERNE

Machine the simple . . . cast the complex

A complete service from design through tooling, production and finish machining. Seventy-one engineering representatives from coast to coast.

arwood

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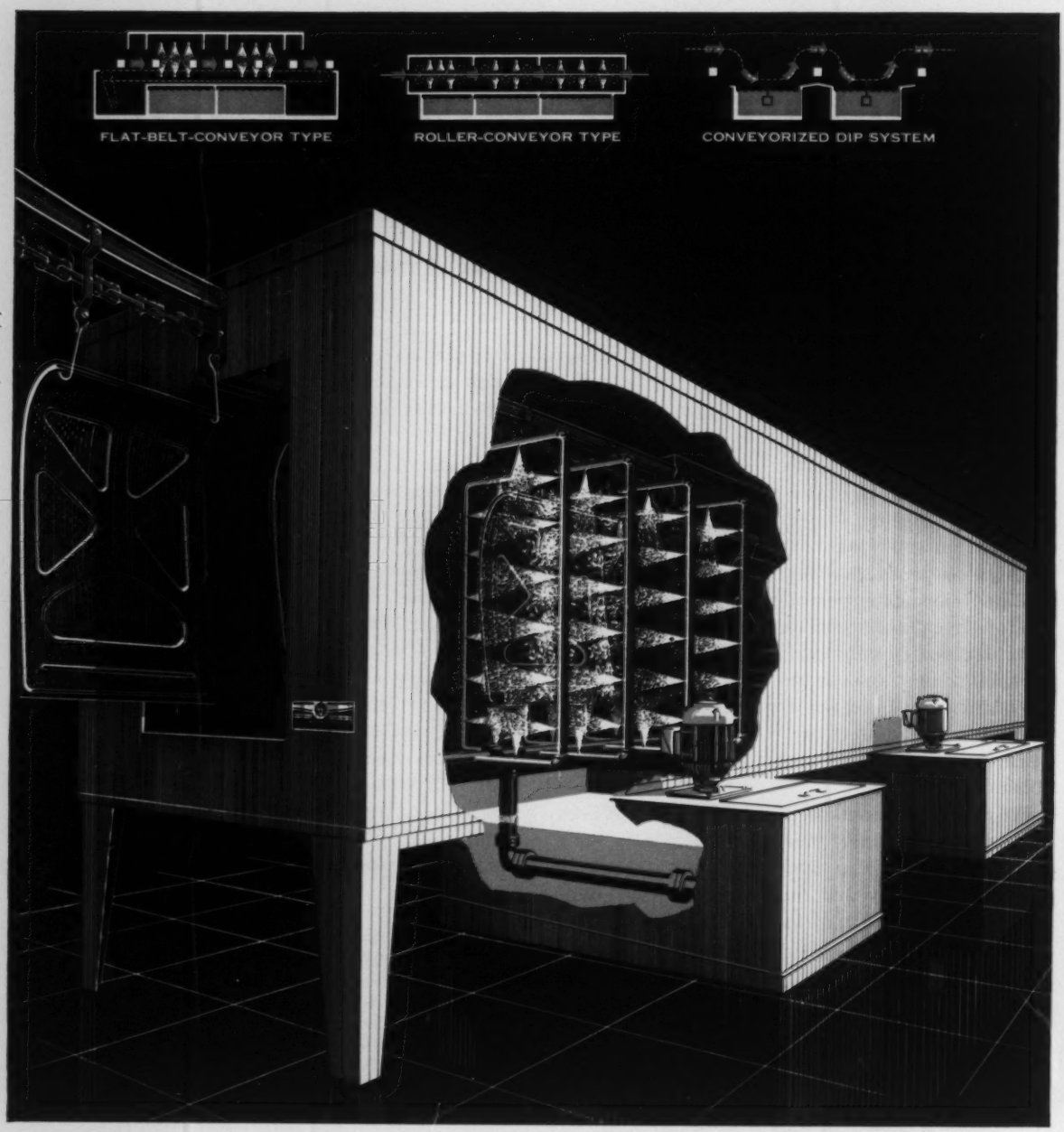

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from DeVilbiss for metal cleaning and surface preparation are offered in both standard and custom designs to meet your exact operating problem. We work closely with your engineers to match machines to cleaning processes, surface treatments, and production requirements — to assure highest efficiency. Engineering, installation, and service facilities are available from coast to coast.

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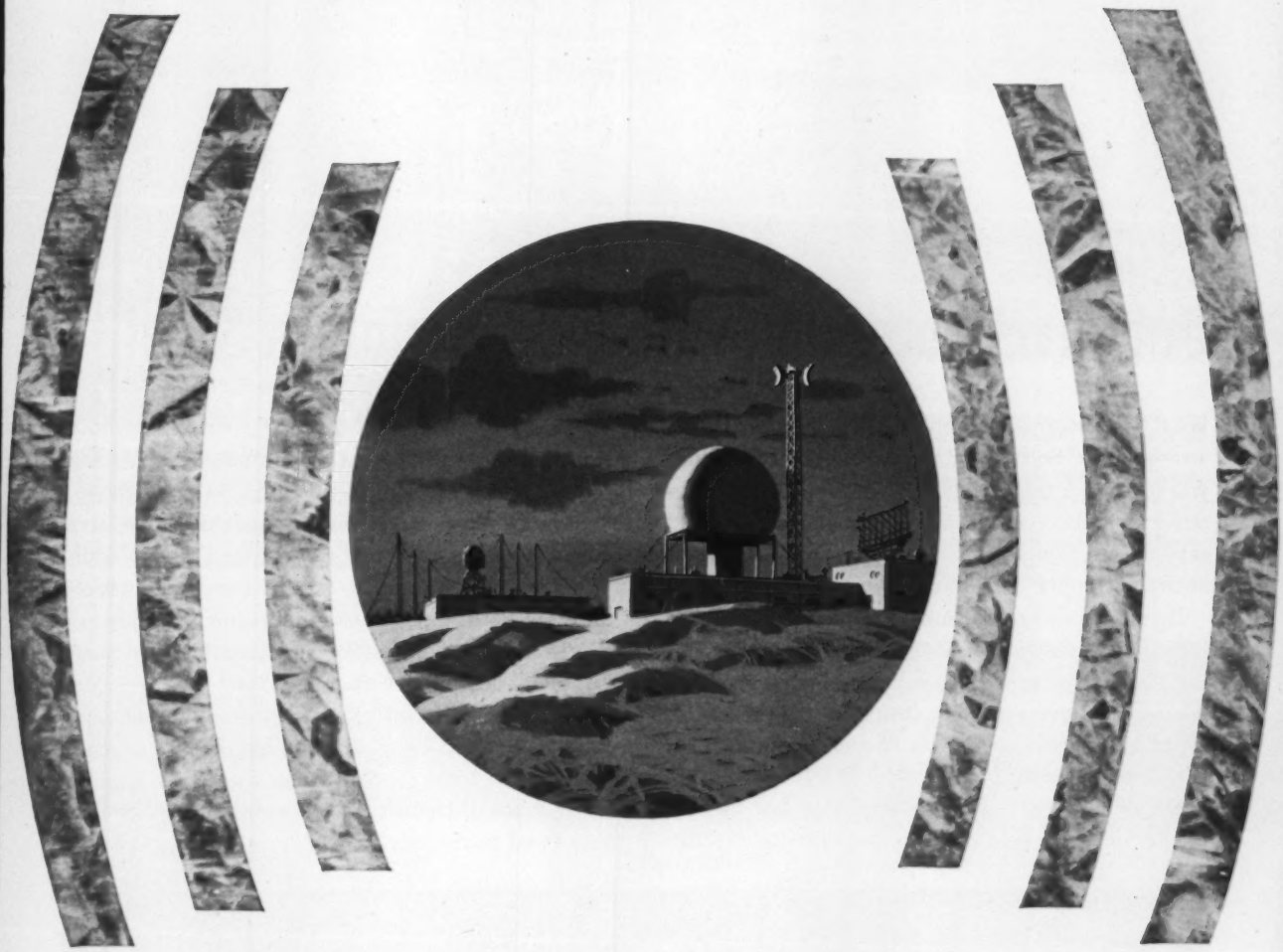
THE DeVILBISS COMPANY, Toledo 1, Ohio. Also Barrie, Ontario; London, England; São Paulo, Brazil. Branch offices in principal cities.

U.S. Air Force DEW-Line buildings fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

Galvanized steel sheets—over 300 tons—will fill a vital need in the construction of unique air terminal/storage buildings for our Air Force's DEW (Distant Early Warning) Line.

The need? Maximum strength plus a defense against the DEW Line's dew point. Based north of the Arctic Circle, these buildings and their interior warmth will abut against bitter outside cold to create a temperature differential up to 130°—and a condensation-corrosion threat as extreme as the −60° surroundings. To eliminate the threat, each building will consist of: insulated galvanized steel floor construction, galvanized steel for outer skin of sidewalls, galvanized steel for inside (vapor barrier) face of sidewalls.

WEIRKOTE® IN PARTICULAR! To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote galvanized steel can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION

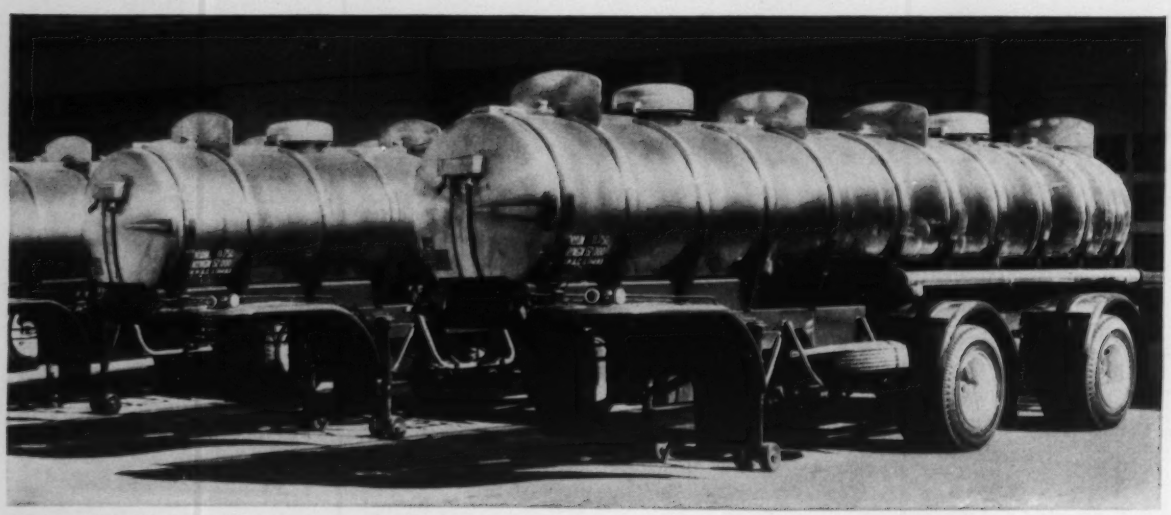
For Stainless Steel, call your nearest Steel Service Center.

Outsmart corrosion with USS Stainless Steel

What's your corrosion problem? Acid? Water? Harsh atmospheres? Solve it with Stainless Steel. Whether you operate a tank truck fleet or manufacture fine paper, whether you specify switch lamps or build skyscrapers, Stainless Steel offers unsurpassed resistance to crippling corrosion.

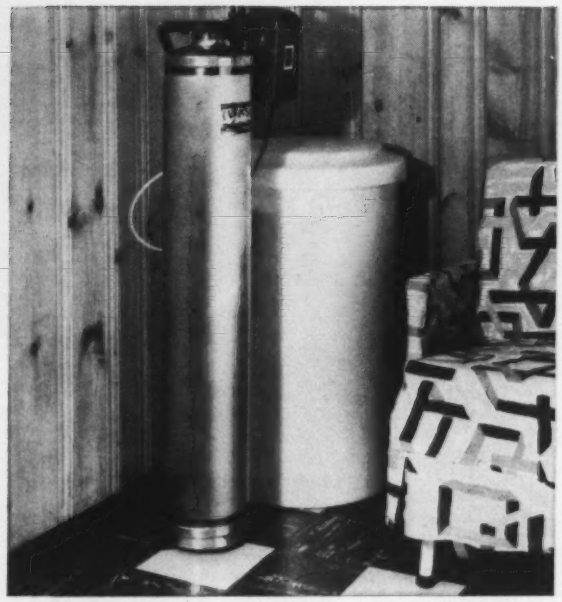
In industrial applications, Stainless Steel resists the corrosive effects of strong acids, so equipment lasts much longer, eliminating premature shutdowns. Stainless is strong, too, so it can be used in critical applications without fear of breakdown. In the chemical industry, Stainless is widely used because it is so easy to clean and does not become contaminated. These same advantages make Stainless ideal for the drug industry (where absolute sanitation is a must) and even for hospital operating rooms (which are almost all Stainless these days).

Stainless Steel can give a product the competitive edge. Its worth to you is far greater than its additional cost because of its excellent corrosion resistance, strength, appearance and superior heat resisting properties. Design quality and long life into your product—design with Stainless Steel. We welcome a chance to work with you when you are planning new products made from Stainless Steel. For more information write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS is a registered trademark.



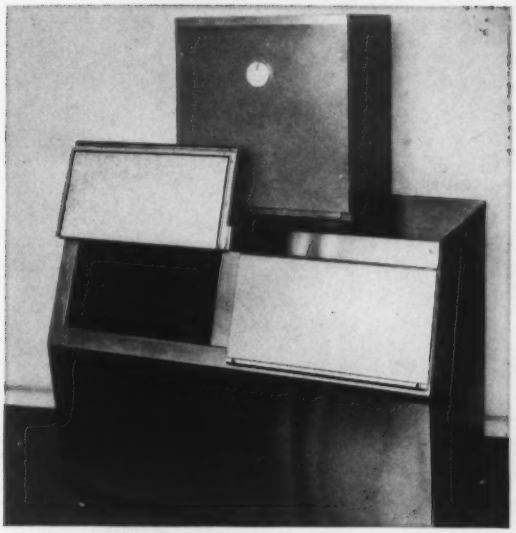
No Stainless Steel tanker has ever worn out.

The tankers here are fabricated from type 304 Stainless Steel, and can carry a variety of acids and chemicals with only a clean-out between trips. No worries about cargo contamination or corrosion, even from many harsh acids. And because Stainless cleans more quickly, the tankers are loaded for the return trip sooner . . . another marketing edge because of Stainless. No Stainless Steel tanker has ever worn out. Tank trailers manufactured by the Tank Division of The Heil Company of Milwaukee, Wisconsin.



How to soften water with Stainless.

This Stainless Steel water softener will last. It is corrosion-proof inside and out. Stainless Steel resists the strong corrosive action of the brine used in the softening process so maintenance is sharply reduced and the tank will last longer. You can install it in your cellar game room and you won't have to worry about appearance because an occasional wipe with a damp cloth will keep it clean and shiny—always. Water softener is manufactured by General Ionics Division of Salem-Brosius, Inc., Carnegie, Pennsylvania.



Keep cool with Stainless.

Ice cube bins provide their owners with an assured inventory to meet unpredictable demands. The service of providing ice cubes to the public is full of peaks and valleys of requests. Bins made of Stainless Steel can meet all these situations with steady performance. Inside, they will always be sanitary because they won't corrode and even the harshest cleaning agents won't harm the surface. Outside, their shiny appearance will always stay shiny for the same reasons. Bonus: because Stainless is so strong, it resists the bumps and thumps of hard usage, doesn't dent or "dimple." Ice chest is manufactured by the Roy Follett Corporation of Phillipsburg, New Jersey.

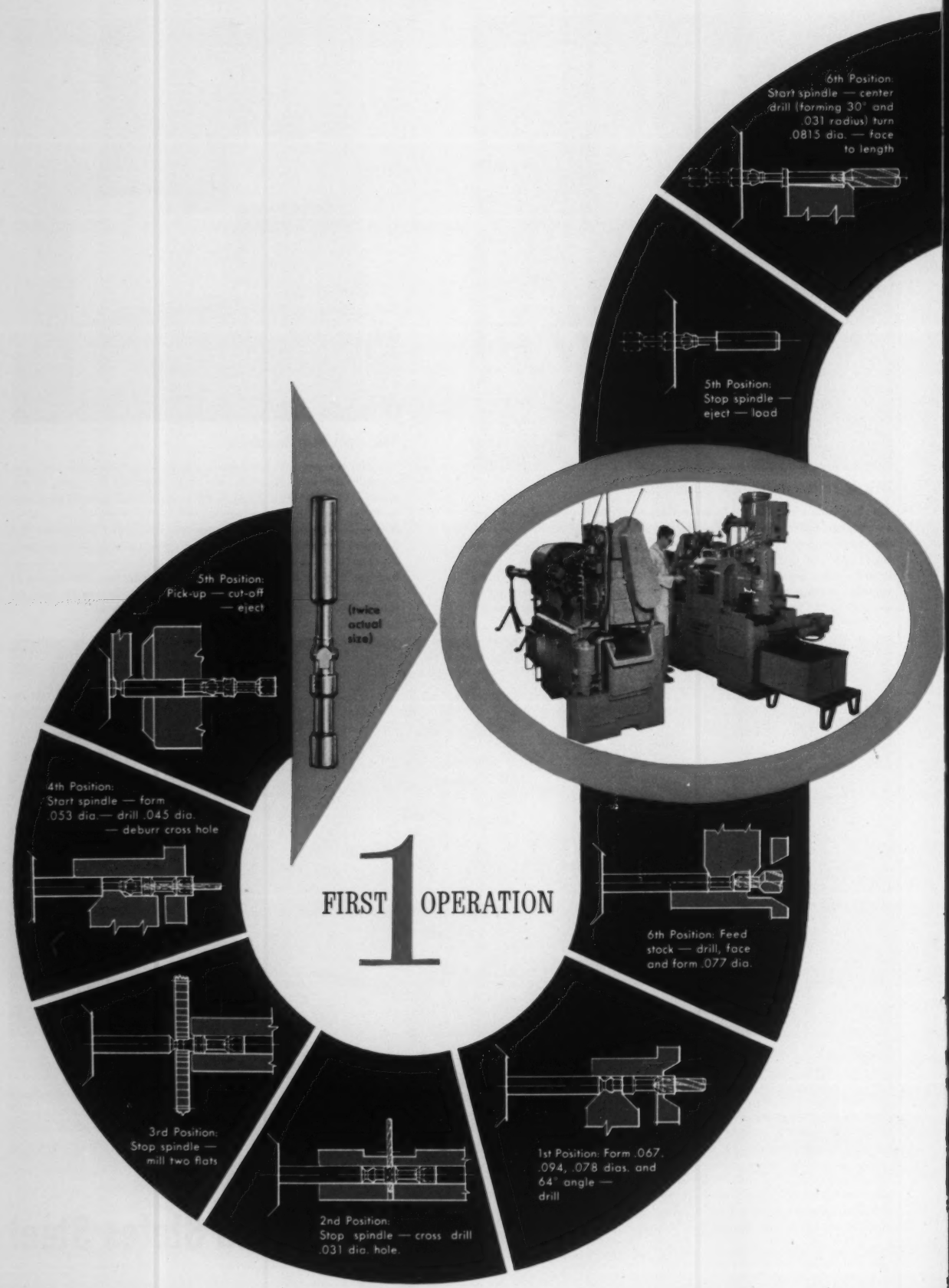
Stainless Steel switch lamps cost the same as cast.

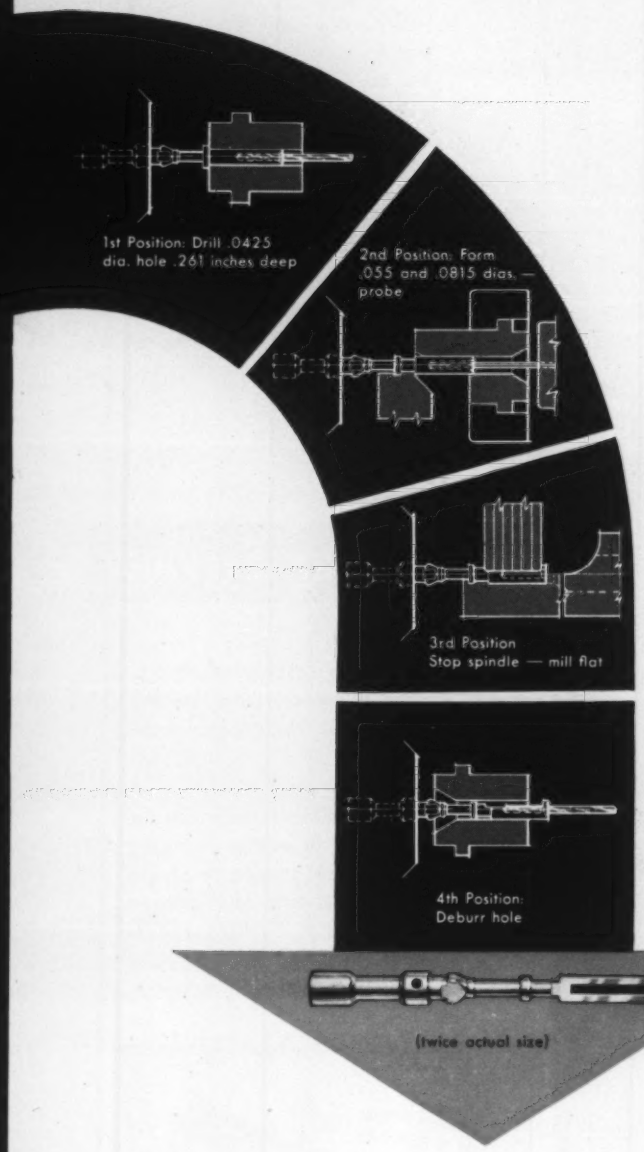
The housing for this railroad switch lamp is all Stainless. It stands out in the weather all year 'round. Many of these lamps have been in continuous service for five years without one sign of corrosion. This lamp is lighter than cast units, yet costs no more. For interior maintenance, the hinged top opens instead of swinging the entire body open as in previous cast lamps. Here dependable Stainless gives a light, first-class housing. Switch lamp manufactured by Lovell-Dressel Co., Arlington, N. J.

Why Stainless Steel is preferred in the pulp and paper industry.

One paper manufacturer puts it this way: "Stainless is used extensively to resist corrosion from acid conditions present in many operations. One important use is for piping pulping liquors. Stainless is preferred for its low cost, cleanliness and ease of maintenance." Papermaking machines are now being built of Stainless because it is the best investment a company can make in terms of long life, corrosion resistance, ease of cleaning and reduced maintenance.

USS **United States Steel**


6th Position:
Start spindle — center drill (forming 30° and .031 radius) turn .0815 dia. — face to length
5th Position:
Stop spindle — eject — load
6th Position: Feed stock — drill, face and form .077 dia.
1st Position: Form .067, .094, .078 dias. and 64° angle — drill
2nd Position:
Stop spindle — cross drill .031 dia. hole.
3rd Position:
Stop spindle — mill two flats
4th Position:
Start spindle — form .053 dia.— drill .045 dia. — deburr cross hole
5th Position:
Pick-up — cut-off — eject
(twice actual size)
FIRST 1 OPERATION


1st Position: Drill .0425 dia. hole .261 inches deep
2nd Position: Form .055 and .0815 dias. — probe
3rd Position Stop spindle — mill flat
4th Position: Deburr hole
(twice actual size)

ACME-GRIDLEYS REDUCE MACHINE TIME 80% OPERATOR TIME 70%

...FOR SCINTILLA DIVISION OF THE BENDIX CORPORATION

When it comes to economically turning out large quantities of identical precision parts, most cost-conscious manufacturers rely on Acme-Gridleys. A good example is one of the nation's leading suppliers of electrical connectors to space age industries, Scintilla Division of The Bendix Corporation, Sidney, New York.

Recently, Scintilla converted production of an electrical contact socket and connector to 7/16" RA-6 Spindle Acme-Gridleys. Working to tolerances of .002 on turned diameters, .005 on concentricities and 50 microinches or better on drilled holes, the Acme-Gridleys reduced per-piece machine time 80% and operator time 70%! There was also a significant reduction in the reject rate.

Savings like this are the big reason Scintilla has close to *seventy* Acme-Gridleys in their modern production setup. In your plant, Acme-Gridleys will pay off in similar cost reductions . . . for years to come.

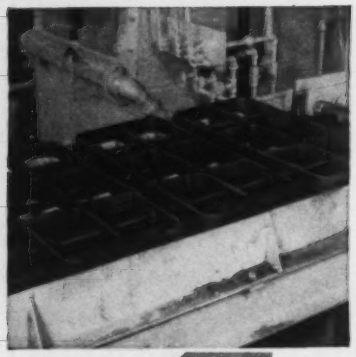
SECOND 2 OPERATION

The number of different jobs that can be set up on Acme-Gridleys amazes everyone. To give you some idea, we've described some 57 actual jobs in a new 64-page bulletin called "Circumferential Automation at Work". At your request, we'll be happy to send you a copy. Call, write or wire.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.



1 HOM, a new alloy developed by Duraloy metallurgists and capable of retaining high working strength at temperatures up to 2200°F, with limited application at 2300°F. The alloy is applicable for all types of castings: static, centrifugal, shell-molded.

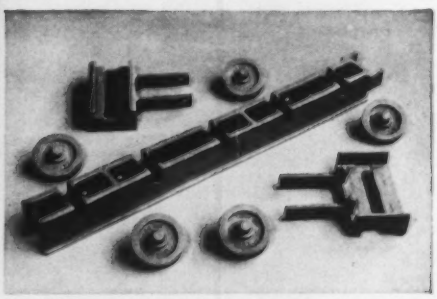
2 Shell-molded castings for meeting close and rigid tolerance limits; post-casting machining or other finishing practically eliminated; low mass production costs.

Illustrating 4 of Duraloy's Major Casting Services

If the casting used in your equipment has to meet high temperature (anything up to 2300°F) and/or corrosion, why not discuss your requirements with our metallurgical staff? Our company can call upon more than 35 years of experience in this exacting business of high alloy castings. In the meanwhile, if you would like to have a copy of our latest catalog, write or call our nearest office.

3 Centrifugal castings which produce a denser, more uniform metal approaching forged metal strength.

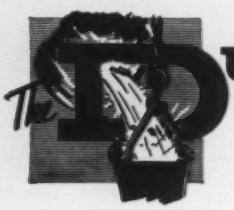
4 Static castings which can be produced in weights ranging from a few ounces to single castings 7 tons and heavier; wide range of alloying combinations, including the new HOM referred to above.



Note

As a point of interest, all of the castings shown here were produced for Lindberg Engineering Company, Chicago, for incorporation in heat-treating and annealing equipment sold by that company. The centrifugally cast tube for the generator, trays, and rollers for the furnace rails are cast of HOM. The rails and rail supports for the furnace are statically cast of 35-15 alloy.

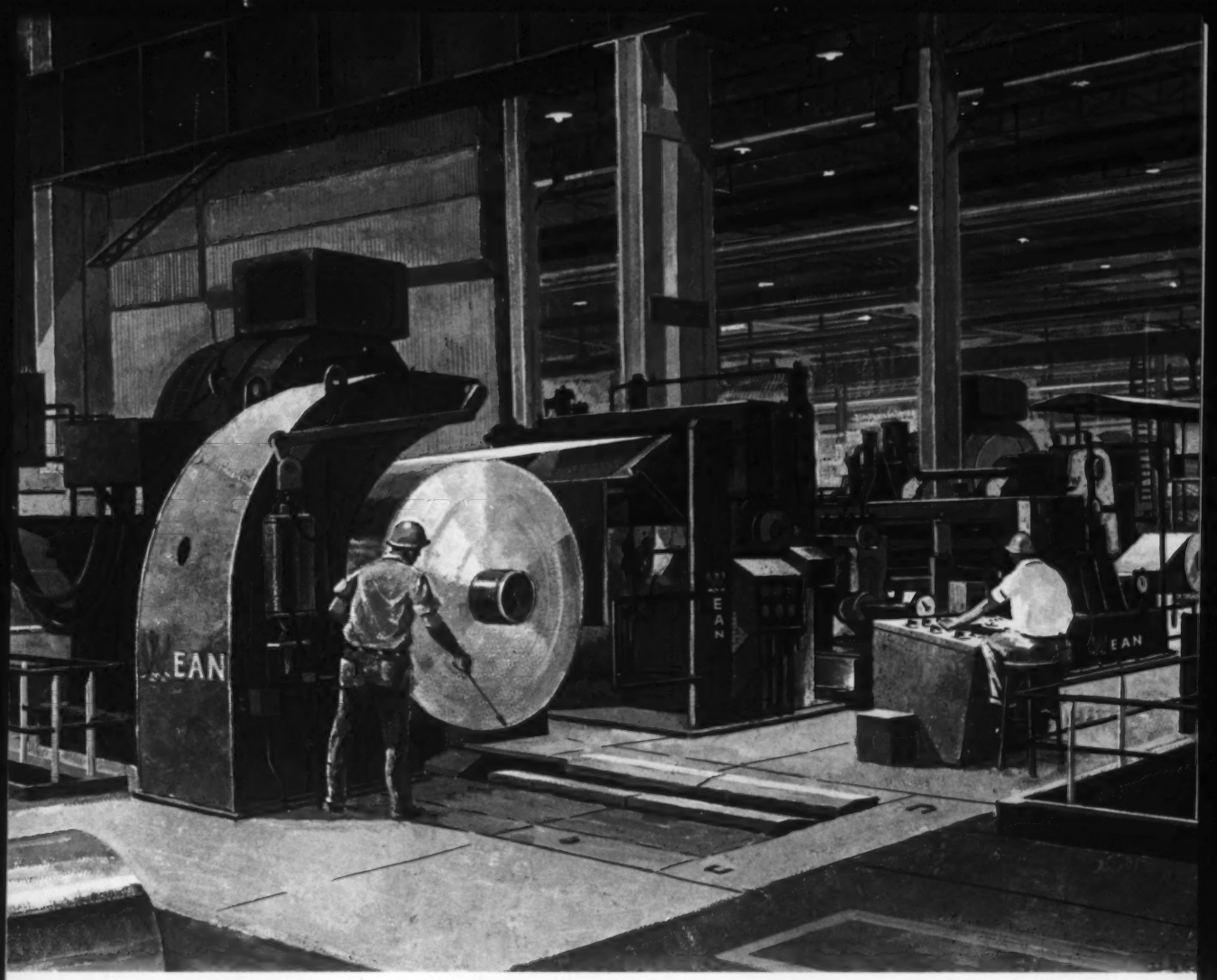
ALLOY CASTING INSTITUTE ACI MEMBER



The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

Eastern Office: 12 East 41st Street, New York 17, N. Y.
Chicago Office: 332 South Michigan Avenue, Chicago, Illinois
Detroit Office: 1025 Maple Road, Troy, Michigan
Houston Office: 4101 San Jacinto, Houston, Texas



PORTRAIT OF PROGRESS: *Wean Coil Preparation Line at Weirton Steel Company, Division of National Steel Corporation*

Weirton Increases Efficiency of Tinning with Wean Coil Preparation Line

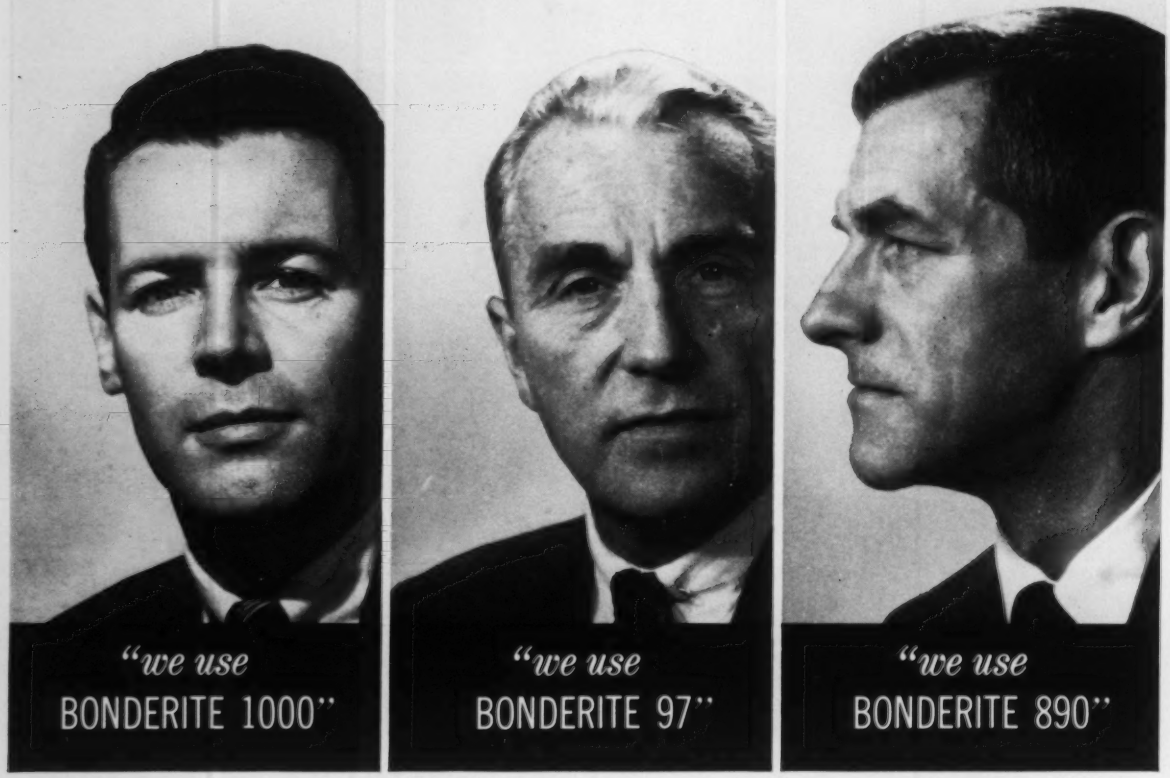
The trend toward purchase of tin plate in coil form has placed increased emphasis on the production of uniformly high quality coils. To assure this uniformity in the end product, Weirton Steel Company has installed this high-speed Wean side-trim and recoil line to prepare coils for the tinning operation. The line side trims tin plate stock and builds up larger, more evenly wound coils for more efficient operation of the tinning lines.

This tension-type line has a maximum speed of 4,000 fpm and is able to handle 60,000 lb. coils 18″ to 45″ wide. Maximum inside diameter of the coils is 16½″; outside diameter, 85″.

More efficient continuous coil processing has been the primary goal of Wean's engineering research for over 30 years. Why not use modern Wean technology to help you in increasing the efficiency of your continuous processing facilities.

THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

Three manufacturers with similar products–



There are 57 different Bonderites for metal

one of them is the right paint base for you

Parker long ago realized that any "universal" phosphating treatment would at best be a compromise. A "universal" treatment can't possibly meet the individual conditions and requirements in any one plant as exactly as can a Bonderite that is formulated with that plant's finish line needs in mind.

Parker has many phosphating treatments (38 of them for steel alone), has trained its representatives to match the right Bonderite to a customer's total requirements, and invests hundreds of thousands of dollars in research and development to keep ahead of the ever-changing finishing demands of modern industry.

Don't compromise on quality with a "universal" treatment when Parker can give you a *Bonderite* that's right for *you*.

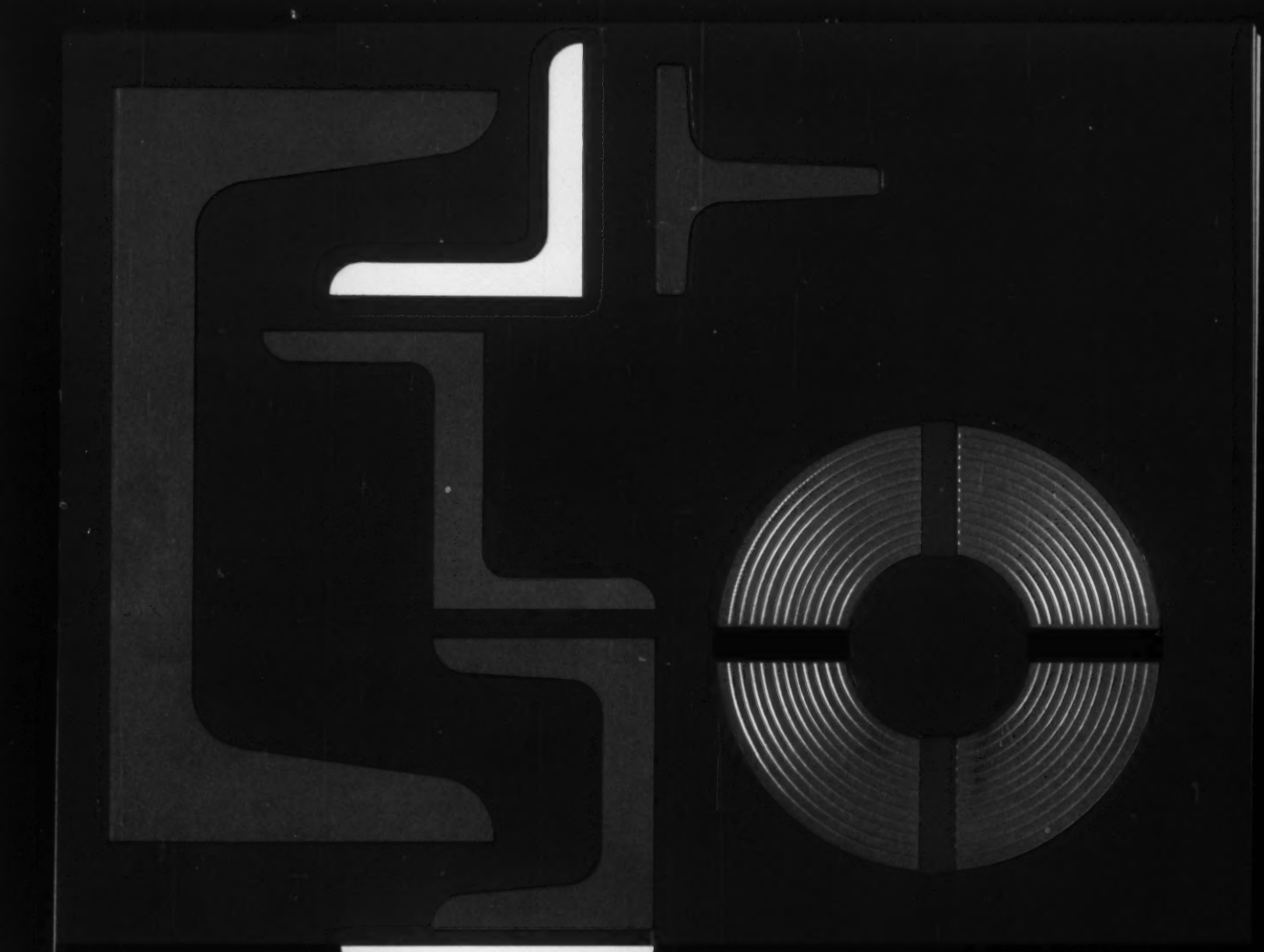
PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

Parker Rust Proof Company
2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

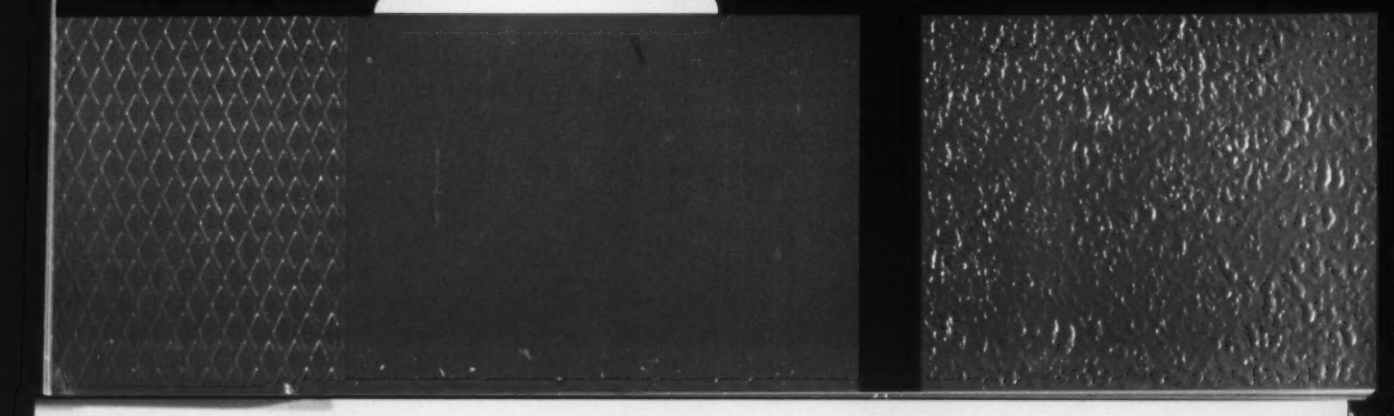
*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.



Widest Range from Any Distributor Source. Calling on your local Alcoa distributor for aluminum in all its forms is like having an Alcoa plant next door. Nobody else stocks as much sheet and plate; wire, rod and bar; tube and pipe; and extruded shapes in as many sizes, alloys and finishes. Nobody else can respond as quickly to your call for metal or technical advice.

ALCOA ALUMINUM

DISTRIBUTED NATIONALLY



ALABAMA
Birmingham 5
Hinkle Supply Company, Inc.
(Fairfax 2-4541)
The J. M. Tull Metal & Supply Co., Inc.
(Fairfax 3-1612)
ARIZONA
Phoenix
Ducommun Metals & Supply Co.
(Bridge 5-4471)
Pacific Metals Company, Ltd.
(Alpine 8-7821)
CALIFORNIA
Berkeley 10
Ducommun Metals & Supply Co.
(Thornwall 1-1820)
Los Angeles 59
Benjamin Metals Company
(Rod & Bar) (Nevada 6-0611)
Los Angeles 54
Ducommun Metals & Supply Co.
(Ludlow 8-0161)
Los Angeles 22
Pacific Metals Company, Ltd.
(Raymond 3-5431)
Los Angeles 22
Tubesales (Tube & Pipe)
(Raymond 3-7781)
San Diego
Ducommun Metals & Supply Co.
(Gridley 7-3141)
San Diego 1
Pacific Metals Company, Ltd.
(Belmont 4-3253)
San Francisco 7
Pacific Metals Company, Ltd.
(Underhill 3-5600)
COLORADO
Denver 16
Marsh Steel & Aluminum Co.
(Keystone 4-1241)
Denver 16
Metal Goods Corporation
(Dudley 8-4141)
CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.
(Trinity 4-1631)
Windsor
Whitehead Metals, Inc.
(Murdock 8-4921)
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Jacksonville 5
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(Evergreen 7-5561)
Miami
The J. M. Tull Metal & Supply Co., Inc.
(Oxford 6-0150)
Tampa 10
The J. M. Tull Metal & Supply Co., Inc.
(3-6741)
GEORGIA
Atlanta 2
The J. M. Tull Metal & Supply Co., Inc.
(Jackson 5-3871)
HAWAII
Honolulu 14
Aluminum Products Hawaii, Ltd.
(94-861)
IDAHO
Boise
Pacific Metal Company (3-6468)
ILLINOIS
Chicago 80
Central Steel and Wire Company
(Republic 7-3000)
Chicago 80
The Corey Steel Company
(Bishop 2-3000)
Chicago 22
Steel Sales Corporation
(Bishop 7-7700)
INDIANA
Indianapolis 18
Steel Sales Co. of Indiana, Inc.
(Liberty 6-1535)
KANSAS
Wichita
Marsh Steel & Aluminum Co.
(Whitehall 2-3231)
KENTUCKY
Louisville 3
Williams and Company, Incorporated
(Juniper 3-7781)

LOUISIANA
New Orleans 12
Metal Goods Corporation
(Jackson 2-7373)
MARYLAND
Baltimore 7
Whitehead Metals, Inc.
(Windsor 4-2000)
MASSACHUSETTS
Cambridge 39
Whitehead Metals, Inc.
(Trowbridge 6-4680)
Roxbury
Eastern Metal Mill Products Company
(Highlands 2-5900)
MICHIGAN
Detroit 12
Central Steel and Wire Company
(Twinbrook 2-3200)
Detroit (Hazel Park)
Meier Brass & Aluminum Co.
(Jordan 6-3902)
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Steel Sales Co. of Michigan
(Tyler 6-3000)
MINNESOTA
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Marsh Steel & Aluminum Co.
(Grand 1-3505)
North Kansas City 16
Metal Goods Corporation
(Grand 1-3516)
St. Louis 14
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(Harrison 7-1234)
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Steel Sales Co. of Missouri, Inc.
(Prospect 1-5255)
NEW HAMPSHIRE
Nashua
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(Tuxedo 3-7731)
NEW JERSEY
Elizabeth
Adam Metal Supply of New Jersey
(Flanders 1-2550)
Englewood
Tubesales (Tube & Pipe)
(Lowell 7-4400)
Harrison
Whitehead Metals, Inc.
(Humboldt 5-5900)
Hillside 5
Miller Steel and Aluminum
Division of Robert Campbell Co., Inc.
(Waverly 6-6000)
NEW YORK
Albany 1
Eastern Metals Warehouse, Inc.
(IV 9-3281)
Buffalo 17
Brace-Mueller-Huntley, Inc.
(TR 7-8700)
Buffalo 7
Whitehead Metals, Inc.
(TR 6-3100)
New York (Long Island City 1)
Adam Metal Supply, Inc.
(Stillwell 6-7737)
New York (Brooklyn)
Strahs Aluminum Company, Inc.
(Browning 2-7000)
New York 14
Whitehead Metals, Inc.
(Watkins 4-1500)
Rochester 5
Adam Metal Supply of Rochester
(Locust 2-4260)
Rochester 1
Brace-Mueller-Huntley, Inc.
(Congress 6-6560)
Rochester 10
Whitehead Metals, Inc.
(Butler 8-2141)
Syracuse 1
Brace-Mueller-Huntley, Inc.
(Howard 3-3341)
Syracuse 1
Whitehead Metals, Inc.
(Howard 3-6241)

NORTH CAROLINA
Charlotte 6
Edgcomb Steel Company
(Franklin 5-3361)
Greensboro
Edgcomb Steel Company
(Broadway 5-8421)
OHIO
Cincinnati 14
Central Steel and Wire Company
(Avon 1-2230)
Cincinnati 37
Williams and Company, Incorporated
(Valley 1-5555)
Cleveland 28
A. M. Castle & Co.
(Axminster 2-7600)
Cleveland 14
Williams and Company, Incorporated
(Utah 1-5000)
Columbus 12
Williams and Company, Incorporated
(Axminster 4-1623)
Toledo 12
Williams and Company, Incorporated
(Greenwood 5-8661)
OKLAHOMA
Tulsa 13
Metal Goods Corporation
(Temple 6-2561)
OREGON
Portland 9
Pacific Metal Company
(Capitol 7-0693)
PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
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Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
(Cedar 1-8600)
York
Edgcomb Steel Company (47-1931)
RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
(Poplar 7-0900)
SOUTH CAROLINA
Greenville
The J. M. Tull Metal & Supply Co., Inc.
(Cedar 3-8366)
TENNESSEE
Memphis 6
Metal Goods Corporation
(Whitehall 8-3407)
TEXAS
Dallas
McCormick Steel Company
(CH 7-3104)
Dallas 35
Metal Goods Corporation
(Fleetwood 1-3271)
Houston 1
McCormick Steel Company
(OR 2-6671)
Houston 1
Metal Goods Corporation
(Riverside 7-1110)
UTAH
Salt Lake City 1
Pacific Metals Company, Ltd.
(Davis 2-3461)
WASHINGTON
Seattle 8
Ducommun Metals & Supply Co.
(Parkway 5-1500)
Seattle 4
Pacific Metal Company (Main 2-6925)
Spokane 4
Pacific Metal Company
(Keystone 5-3681)
WISCONSIN
Milwaukee 1
Central Steel and Wire Company
(Humboldt 1-5000)
Milwaukee 9
Steel Sales Co. of Wisconsin
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Call The Aluminum Man . . . his stock's the most complete!

Your Alcoa distributor sales representative—*The Aluminum Man*—maintains a warehouse bulging with sheet and plate; tube and pipe; extruded shapes; wire, rod and bar. His stock represents the widest range of aluminum products available from any distributor source. He can arrange for them to be slit, sawed or sheared to your specifications—furnish technical advice you may need on alloy selection and fabrication techniques. He's your fastest supply line for aluminum in any form when you need it. Your nearest Alcoa distributor is listed on this page, so give him a call . . . soon. Aluminum Company of America, 845-G Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

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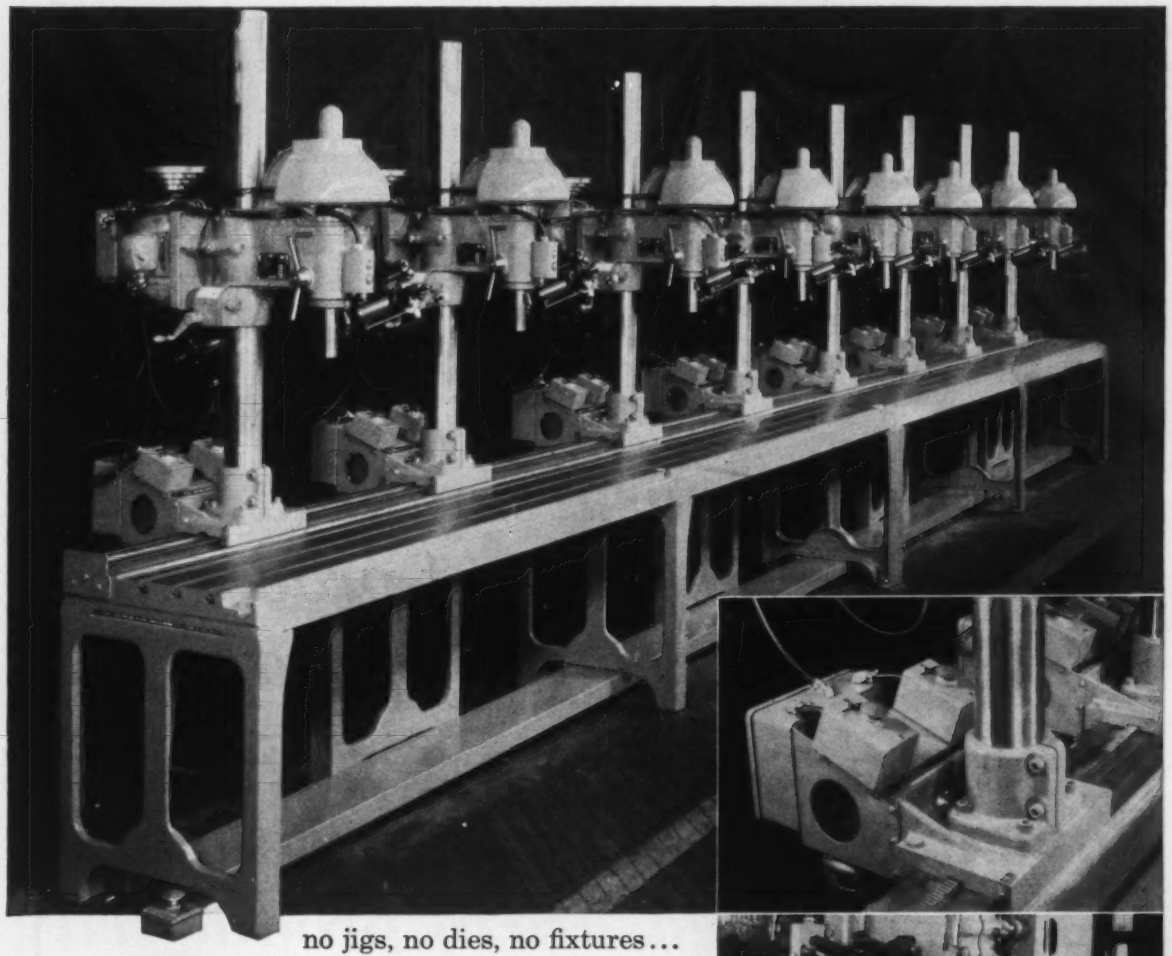
Call *The Aluminum Man* . . . he's your Alcoa distributor sales representative



no jigs, no dies, no fixtures...

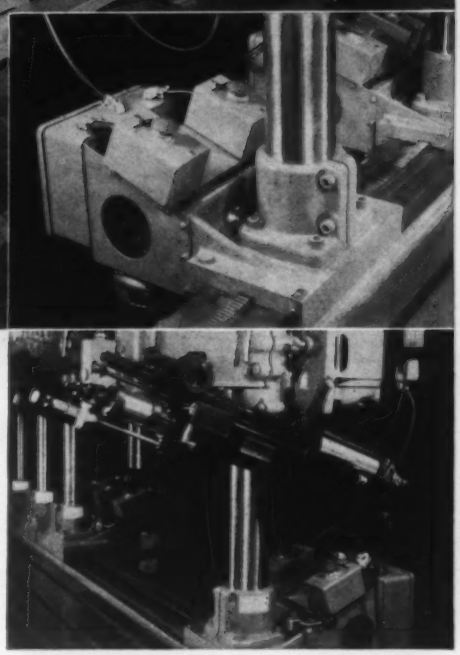
29 holes at the touch of a switch!

Production drilling engineered by 'Buffalo'

PROBLEM: Drilling as many as 8 sets of holes in straight sections of aluminum channels to be formed into door and window frames, with varying hole patterns at exact locations to fit hardware and cross members of different size frames.

SOLUTION: A specially engineered 8-spindle 'Buffalo' No. 18 Drilling Machine with air-operated spindles and gear motor-positioned spindles mounted on 28-ft. T-slotted and dovetailed table. Two jogging push buttons on each head move it left or right to nearest $\frac{1}{16}$" by stainless steel scale and indicators. Thus heads may be set up quickly for any pattern with holes as close as $12\frac{1}{4}$". A single foot switch actuates all spindles simultaneously, though any air feeds may be locked out.

CONCLUSION: For fast, accurate, flexible drilling, there's a 'Buffalo' machine quality-built for the job, or 'Buffalo' can engineer one to your exact specifications. Let us know your problem!



TOP: Spindle closeup showing motorized racking device, scale and indicator.

BOTTOM: Showing air-operated spindle feed, rack, slide and clamping device.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Time is the measure of productivity

Time is the measure of productivity
Time is the measure of productivity

Time is the measure of productivity
Time is the measure of productivity
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Time is the measure of productivity
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Time is the measure of productivity

Time is the measure of productivity

Reduce grinding time and you increase productivity. Norton's many time saving innovations in varied stages of grinding production can reduce your grinding time up to 30%! The story is a profitable one. Here's why —

Norton Grinding Machines are engineered to permit higher wheel speeds to reduce cutting time. Norton's *Automatic Wheel Balancer* balances the wheel in *five seconds— on the machine.* You reduce time spent "grinding air" up to 85% because of Norton's *Automatic Wheel Contact Accelerator* which speeds the wheel to the work and compensates for work piece-diameter variation. Another advance is Norton's *Automatic Truing* which eliminates work interruptions and the *Automatic Wheel Wear Compensator* that stabilizes the grinding cycle.

Norton Grinders further add to your productivity by minimizing work spoilage with *Automatic In-Process Gaging.* In the case of surface grinders Norton *Higher Table Speed of 150 fpm* actually reduces grinding time up to 50%.

These are only some of the many reasons you can increase your productivity with Norton Grinders. They also offer accessories that literally transfer skills to machines — *ultra-fine feed,* and *automatic features* such as *steady resting, endwise locating, loading, constant peripheral wheel speed* and *hydraulically-operated feed screws* provide this competitive advantage.

The decision is yours — can you afford not to reduce the time it takes to produce your product? Can you afford not to increase your productivity? Contact your Norton man, NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co. Ltd., Toronto 5.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines

NORTON
MACHINE TOOLS

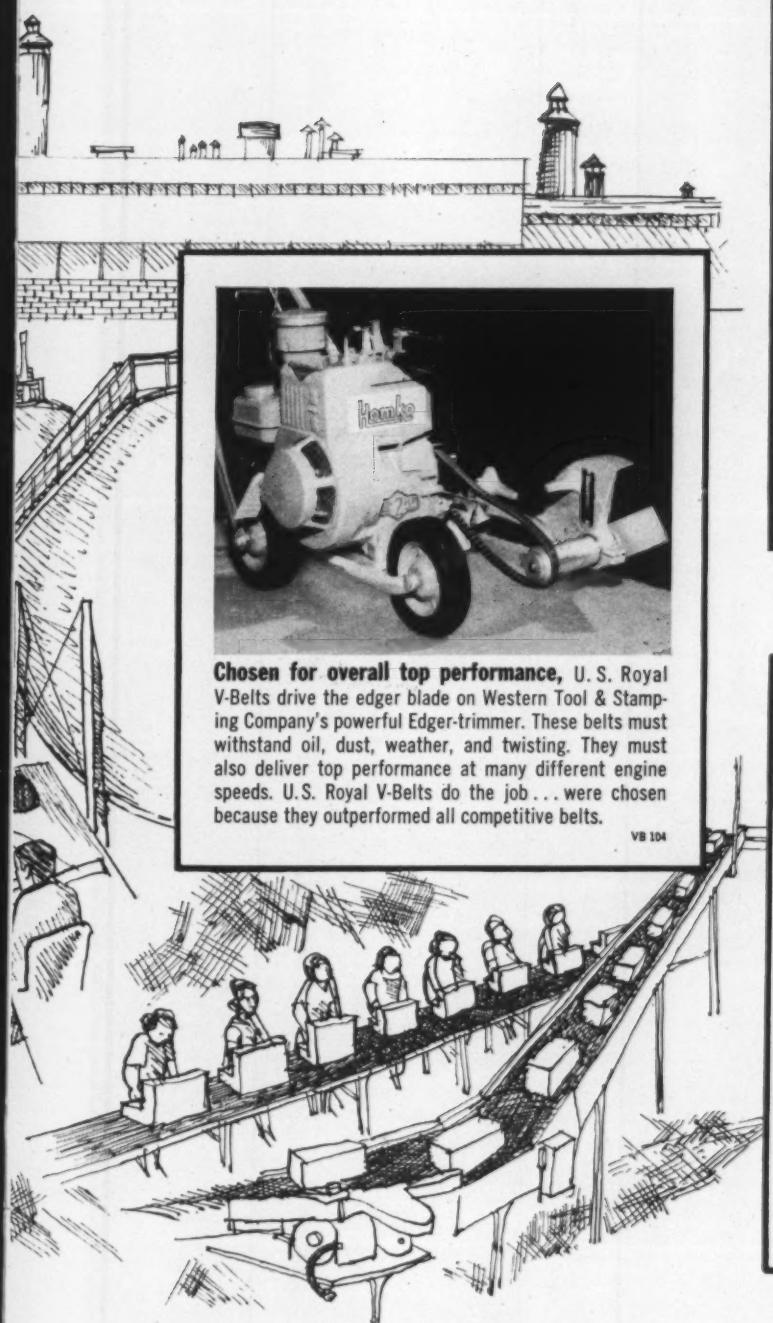
Making better products... to make your products better

AT THE HEART OF INDUSTRY...

Helping to set a world speed record . . . a U.S. PowerGrip "Timing"® Belt is the key link in the drive train of this Mercury outboard. U.S. "Timing" Belts' positive tooth engagement prevents slippage, insures perfect synchronization. These belts have high flexibility and strong gripping teeth, are backed by steel cord, permit more compact sheaves, need no maintenance.

TB 103

Wherever the design and production of power equipment is involved, you'll find US Industrial Rubber Products...helping to simplify the design, improving the efficiency and reliability of equipment both new and old, adding to the profit of manufacturer and operator alike.

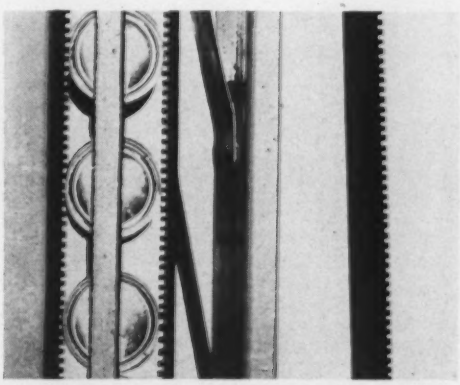


Chosen for overall top performance, U. S. Royal V-Belts drive the edger blade on Western Tool & Stamping Company's powerful Edger-trimmer. These belts must withstand oil, dust, weather, and twisting. They must also deliver top performance at many different engine speeds. U.S. Royal V-Belts do the job . . . were chosen because they outperformed all competitive belts.

VB 104

Providing better steering control for Clarke's new Power Sweeper, a U.S. PowerGrip Flexible Coupling has eliminated cumbersome, costly metal parts and their need for lubrication . . . provides quieter, cushioned, yet responsive steering. These easily installed couplings not only compensate for lateral and axial misalignment, but reduce vibration and absorb jarring shocks.

FC 103



"Nothing short of spectacular," says an Anheuser-Busch brewery manager about two U. S. SteepGrade Conveyor Belts that lift wet 16-oz. beer cans at a 90° angle. The secret of this non-slip operation is SteepGrade's "gripper cleat" construction which holds the cans firmly, yet gently, allows less pressure and belt speed, eliminates damage to cans and smearing of print.

CB 124

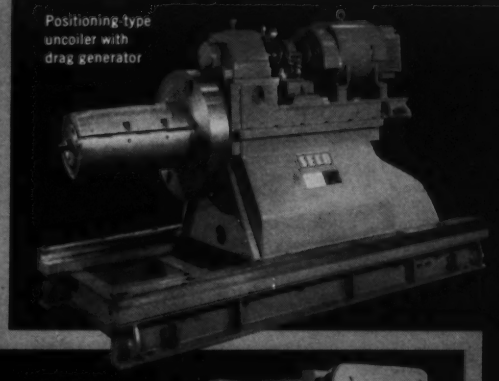
For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER
OF INDUSTRIAL RUBBER PRODUCTS

US RUBBER

United States Rubber

MECHANICAL GOODS DIVISION



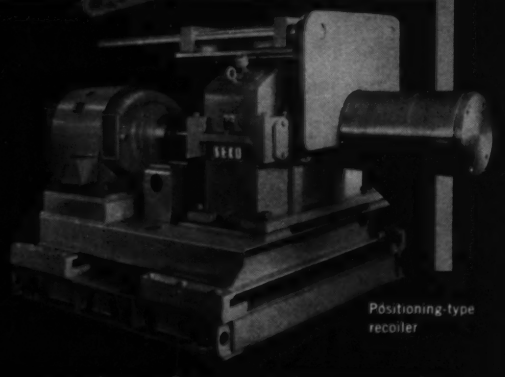
Positioning-type uncoiler with drag generator

Predictable Performance

for processing lines with

SECO

terminal equipment



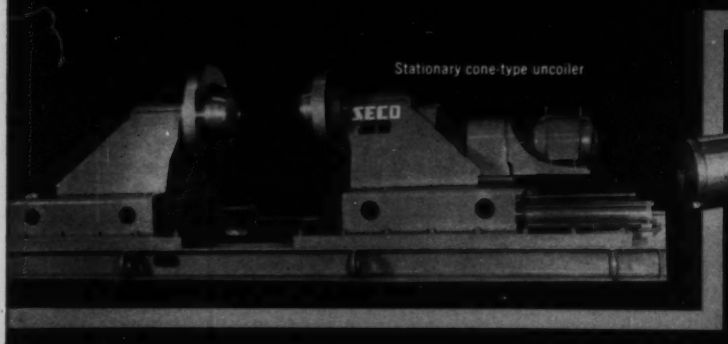
Positioning-type recoiler

From entry to exit, new and modernized processing lines . . . annealing, pickling and others . . . perform better with SECO terminal equipment. This equipment handles coils ranging from 10,000 to 50,000 pounds with speed, convenience, safety.

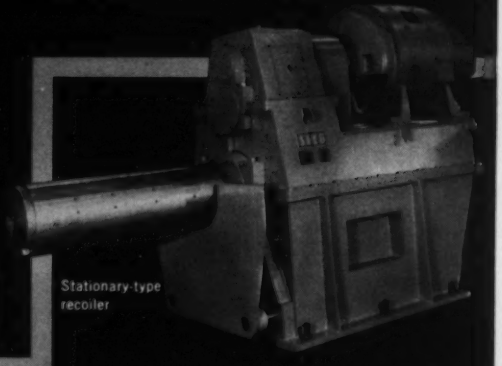
SECO uncoilers and recoilers are designed to operate at any speed the mill requires, are available in positioning or stationary types. The positioning types feature a slideable reel base mounted on a sub-base for alignment with the processing line, actuated by an automatic edge control.

SECO also makes auxiliary equipment such as coil cars with coil lifts to simplify uncoiler loading and recoiler unloading. Available for mandrel or cone-type reels.

A staff of trained sales engineers will assist you in finding the equipment best suited to your needs. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles.



Stationary cone-type uncoiler



Stationary-type recoiler

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Affiliated with Lee Wilson Engineering Co., Inc.

LET MUELLER MAKE IT!

Mueller Brass Co. of Port Huron is much more diversified than the name "Brass" implies . . . a lot more. In fact, because of its many and varied facilities . . . its *men, methods* and *metals* . . . Mueller is in the unique position of being able to offer true single source service.

MUELLER HAS THE MEN . . . experienced engineers with the ability to work out, creatively, tough design problems, and improve a part or components for production by the most economical method. You get sound engineering plus 44 years of practical metalworking production experience when you "Let Mueller Make It".

MUELLER HAS THE METHODS . . . when you "Let Mueller Make It", you are utilizing one single source that is able to produce parts any one of these ways: as forgings, impact extrusions, sintered metal parts, screw machine products, formed tube or as castings.

MUELLER HAS THE METALS . . . and the materials . . . to produce precision parts in aluminum, brass, bronze, copper, iron and steel in hundreds of different alloys to meet each exact requirement.

In addition, Mueller Brass Co. has complete and modern facilities for performing all types of finishing and sub-assembly operations. Another plus value is nation-wide sales engineering service.

So, in the final analysis, no matter where you fit in the American industrial picture, whether you're making missiles or mowers . . . and no matter where you're located, it will pay you to LET MUELLER MAKE IT!

MUELLER BRASS CO. PORT HURON 26, MICHIGAN

340

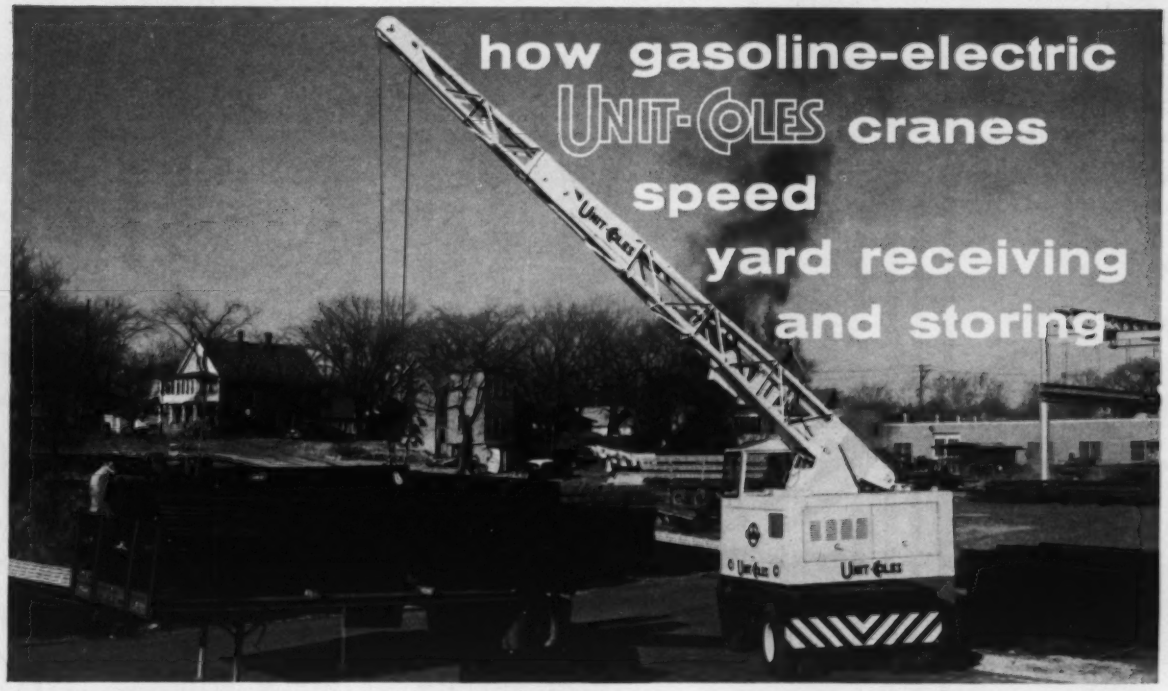
YOU CAN ADD THIS ENGINEERING TEAM TO YOUR STAFF WHEN YOU

LET MUELLER MAKE IT!

When you work with the Mueller organization, a qualified team of trained, experienced and imaginative engineers automatically become part of your staff and go to work for you. This engineering team, which includes specialists in all categories of design work and production procedures, carefully considers all aspects of your particular part or assembly and its function. In conjunction with members of your engineering department, Mueller engineers can help design or re-design your part for improved performance, eliminate, where possible, unnecessary parts through re-design by making two or three part assemblies as a single piece, and recommend the best method of production. Mueller people also consider ways of speeding your finishing and assembly operations. Production economies consistent with product quality are always a prime consideration.

This TOTAL CONCEPT engineering service, which costs no more, is available to you when you . . . LET MUELLER MAKE IT!

MUELLER BRASS CO. PORT HURON 26, MICHIGAN



- *no gear changing, clutching or de-clutching*
- *simple, finger-tip control*
- *time-saving independent or combination hoist, swing and travel*
- *fast, one-man operation*
- *smooth, precise lifts*
- *world's safest crane*

Unlike ordinary clutch-type yard cranes, the UNIT-COLES has no clutches — no gears to change — just an uninterrupted flow of power, with the most precise control. An engine-generator unit powers separate electric motors for boom-hoist, load-hoist, swing, and travel. As a result, every motion is fast and precise, with no jerking or grabbing when picking up or spotting a load.

Control is simple and fast — effortless as flipping a light switch. The load is powered up and down at any speed from less than a foot per minute to 150 f.p.m. The brakes are automatically applied, preventing load drift and accidental load loss. To meet a variety of job requirements, your operator can lift, boom, swing, and travel simultaneously or separately. "Instinctive" steering — left for left and right for right — with the revolving superstructure in any position, eliminates costly steering errors when maneuvering in congested areas.

For positive protection of employees, load, and crane, UNIT-COLES offers an exclusive Automatic Safe Load Controller that pre-warns of dangerous load conditions — stops and holds the load and boom when the maximum safe load radius is reached. Quickly adjustable limit switches prohibit dangerous over-travel of the boom and hook block. Should the engine stop, automatic "fail-safe" brakes immediately stop all crane motions. "Dead man" type controls automatically set the brakes if accidentally released.

Take a new look at your own receiving and storing problems — then compare the superior UNIT-COLES advantages when considering a new yard crane. For further information on UNIT-COLES Cranes in capacities from 5 to 55 tons, and the name of your nearest dealer, write or wire collect today.

THE WORLD'S SAFEST CRANE

UNIT-COLES

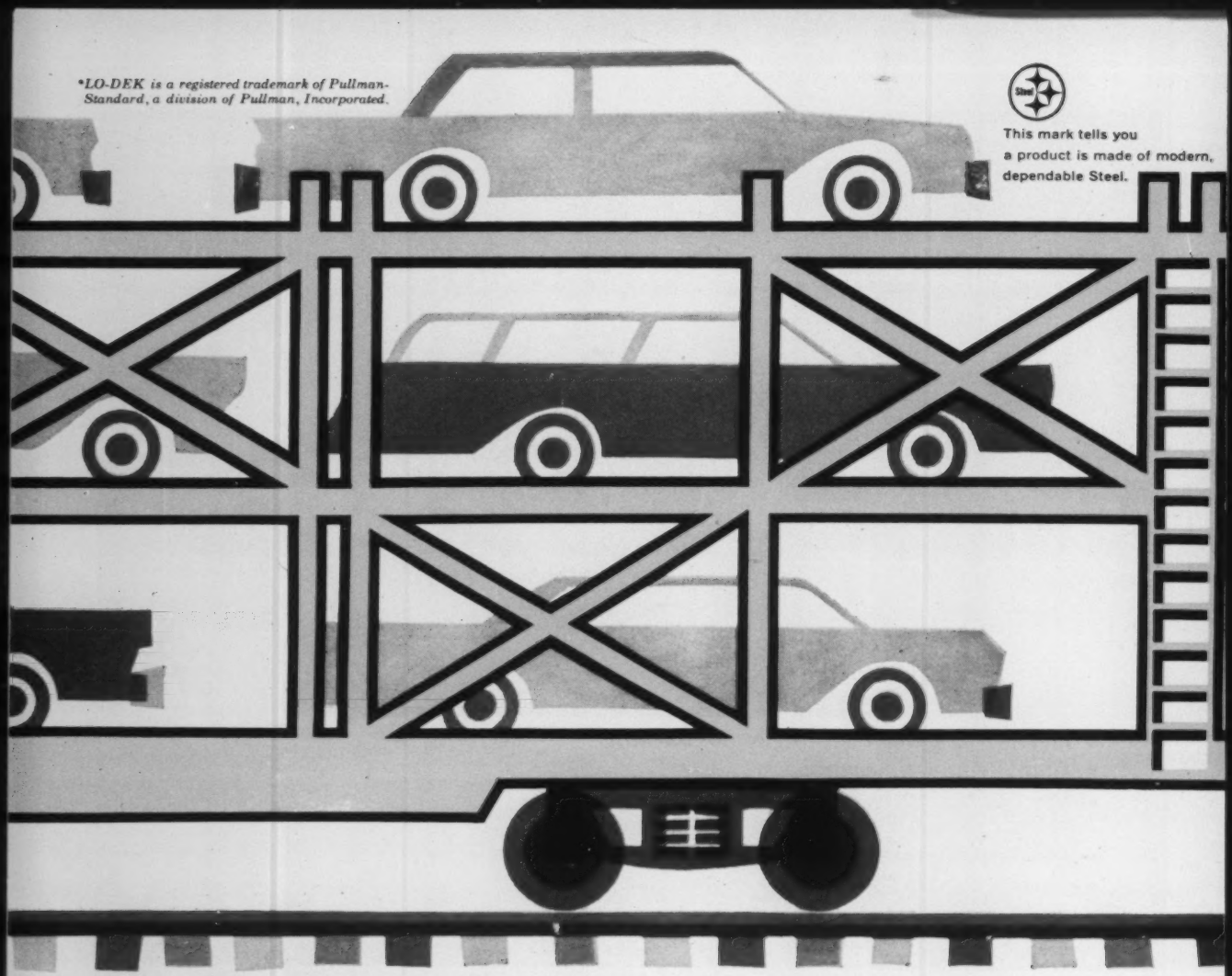
UNIT CRANE & SHOVEL CORP.
6721 W. Burnham Street
Milwaukee 19, Wisconsin

stacks high in tight quarters

See how the UNIT-COLES "threads" itself through a narrow aisle, to stack these big, heavy containers 30 ft. high. With the cantilever boom, this crane can work closer to the stack, with less aisle room, and can stack higher because of the high pivotal point of the boom. And the UNIT-COLES has a shorter tail-swing and turning radius, allowing a full 360° swing in a narrow 12 ft. aisle.

*LO-DEK is a registered trademark of Pullman-Standard, a division of Pullman, Incorporated.

This mark tells you a product is made of modern, dependable Steel.



New LO-DEK* lightweight steel cars boost railroad freight business

built 10 tons lighter and 10 inches lower with USS Tri-Ten High-Strength, Low-Alloy Steel

An important factor in the recent increase in piggy-back business among the railroads is Pullman-Standard's LO-DEK Flat Car which weighs 10 tons less than a conventional 85-foot car and has a deck that is 10 inches lower.

30% weight reduction. Skillful design and the use of 18 tons of USS TRI-TEN High-Strength, Low-Alloy Steel shapes, plates and sheets in the underframe, floor and side sills of the car, helped make it lighter and lower. Because of TRI-TEN Steel's strength and weldability, structural and plate thicknesses were reduced as much as 25 to 30% with no sacrifice in strength or safety of the car body. Use of redesigned 28" diameter wrought steel wheels instead of regular 33" wheels helped to lower car height and further reduced weight. United States Steel supplied wheels for these cars.

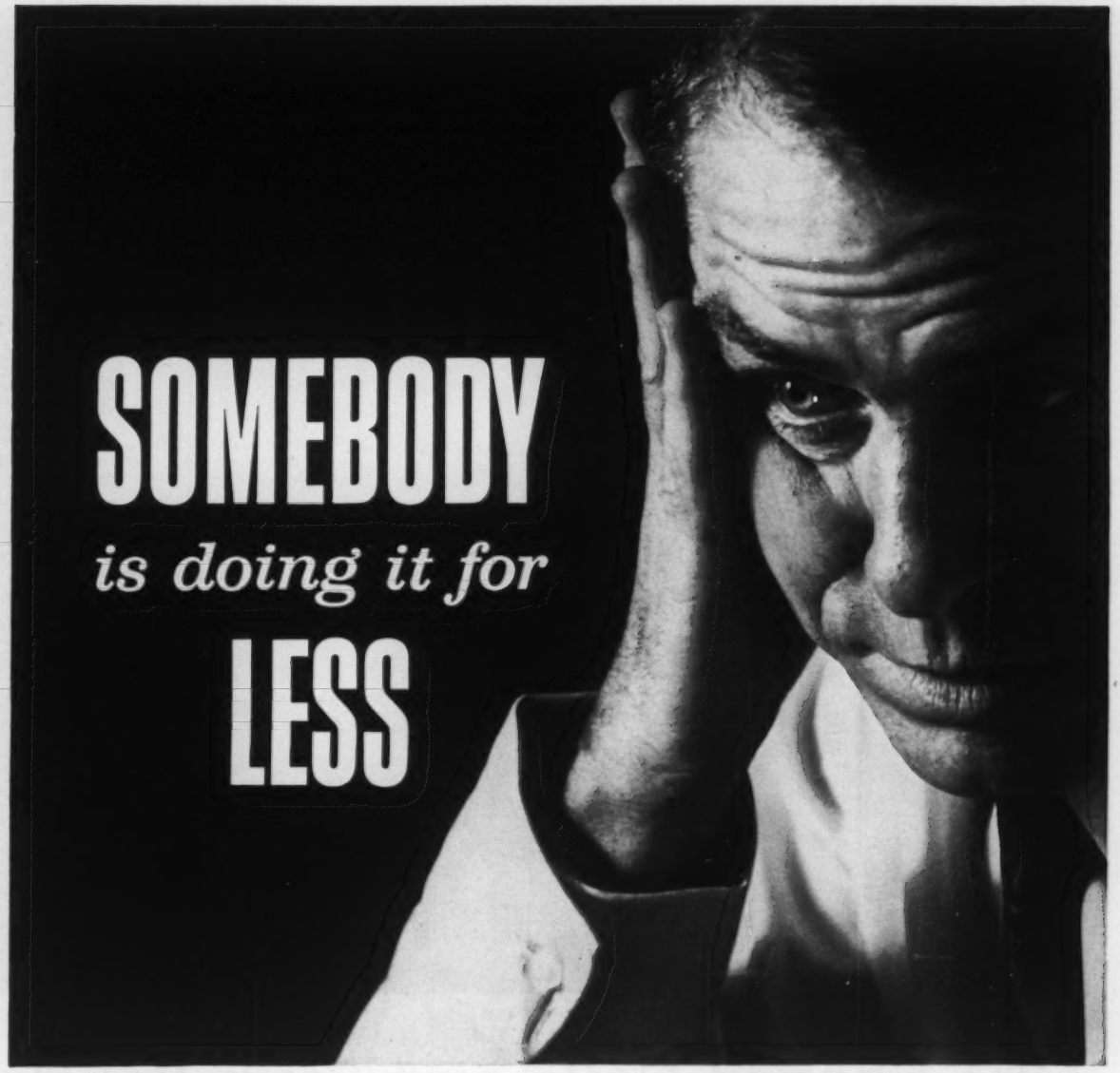
10 inches less height. Where railroads have low tunnels and minimum clearance underpasses, the extra 10 inches of clearance can be very important, especially when hauling high-cube truck trailers, highway auto transporters, or loaded triple decked automobile racks.

Cargo versatility. The LO-DEK Car can be equipped to handle multi-level automobile racks with capacity of 12 to 15 cars, two standard truck trailers, or conventional container shipments.

Economy. Since 10 tons of weight per car have been eliminated, 250 tons less dead weight are hauled in a 25 car consist—an important railroad operational economy. Substantial savings in motive power can be realized, too, in handling and classification of cars without loads. For further information or technical help on USS High Strength Steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS and TRI-TEN are registered trademarks.

United States Steel Corporation • American Steel and Wire Division • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company

USS **United States Steel**



MASTERLINE® 51B SUPERFINISHER

New—for parts not requiring traverse. Longitudinally adjustable platen supports reciprocating unit holding one or two quills. Add a second platen and you can handle up to four diameters at once—automatically.

Model 52A, which is similar, offers longitudinal stone traverse. Call your Gisholt Representative or write for Catalog 1159-C.

Are you giving your competitors a price edge by not using Superfinishing?

This modern process enables you to control surface finish from 1 micro-inch RMS to 80—piece after piece—*automatically*. Whether you Superfinish® after grinding or direct from turned surfaces, you will improve quality, metallurgy and geometry. And in either case you save time and money.

Whether you finish cylindrical, tapered, flat or spherical surfaces, Superfinish enables you to do a better job at less cost.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

CF&I Shaped Coils and Stem-Paks® are Packaged for Your Production

SHAPED COILS

Here's a quote from one satisfied user, the president of a wire fabricating plant:

> "A CF&I salesman examined our operation and suggested that we use CF&I Shaped Coils as opposed to the small coils we had previously used. We now stop our machine only once to start a new coil, instead of 10 times a day. We save nearly 2 hours, and have increased our production by about 20%."

CF&I-Wickwire Shaped Coils contain between 1500 and 2500 lbs. of top quality wire in one continuous length . . . are bundled with four steel straps and, when necessary, wooden supports to insure that the coil is not distorted.

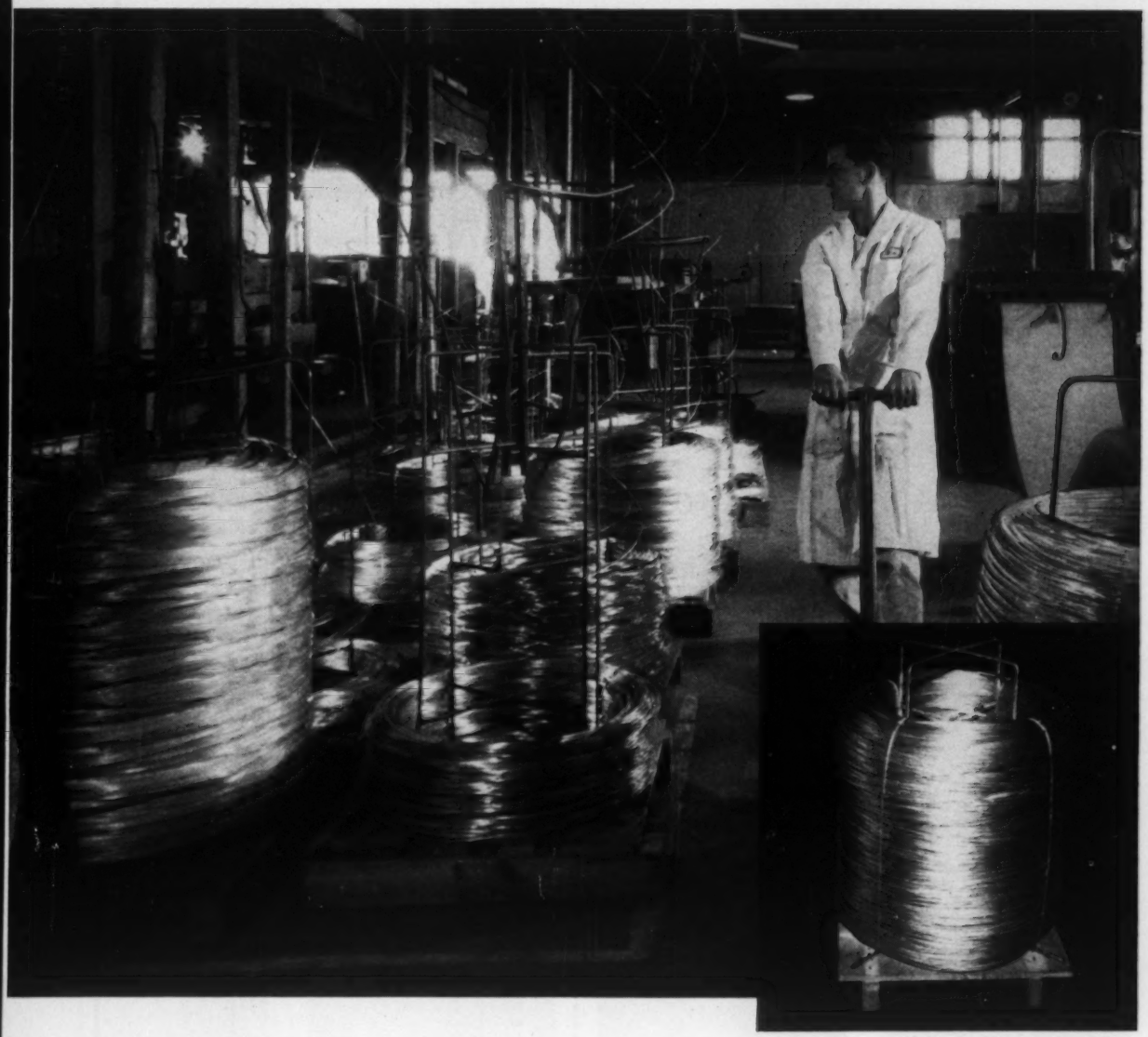
OPERATING ADVANTAGES: Increased production, reduced material-handling costs, less wire scrap and less storage space needed.

DISPOSABLE STEM-PAKS

The experience of a typical user:

> "Up to 75% of our production downtime was caused by using too many small coils. Stem-Paks hold 500 to 1000 pounds of continuous wire. These larger packages keep each machine running as much as 1½ hours longer per day. Stem-Paks allow for free unwinding, without snarling. CF&I Stem-Paks have increased our production 50%."

Stem-Paks hold 500-1000 lbs. of wire in one continuous



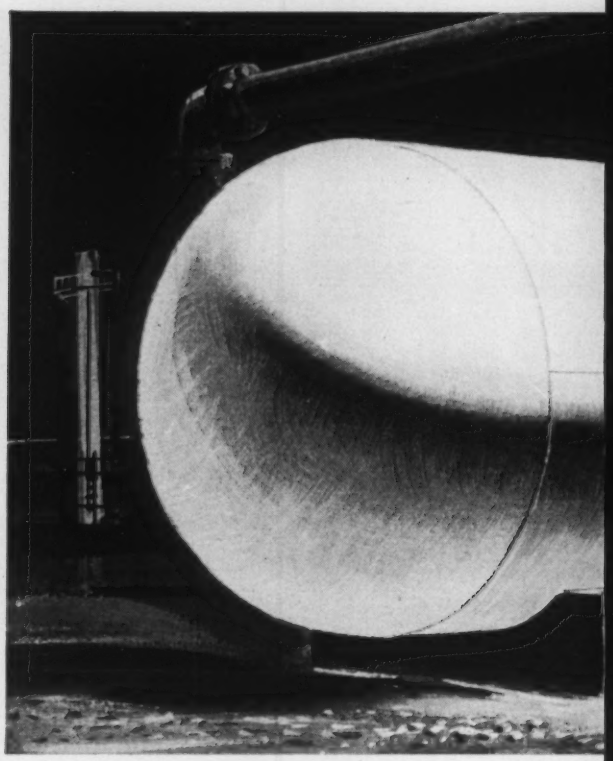
length . . . consist of a center core attached to a wooden base mounted on 4″ runners.

AVAILABLE IN: Sizes for 14″, 17″ and 21″ center core (inside diameter).

OPERATING ADVANTAGES: Ease of handling, reduced scrap losses, increased production and less storage space.

Only CF&I offers a total of ten different wire packages. You've just read how two of these packages have increased the production efficiency of leading manufacturers. One or more CF&I-Wickwire Wire packages can do the same for you. Our engineering staff will be happy to study your operation and recommend the type that best meets your requirements. For complete details, write your local CF&I sales office.

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities



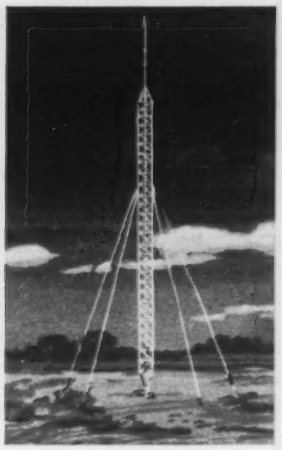
SSS 100 ALLOY STEEL

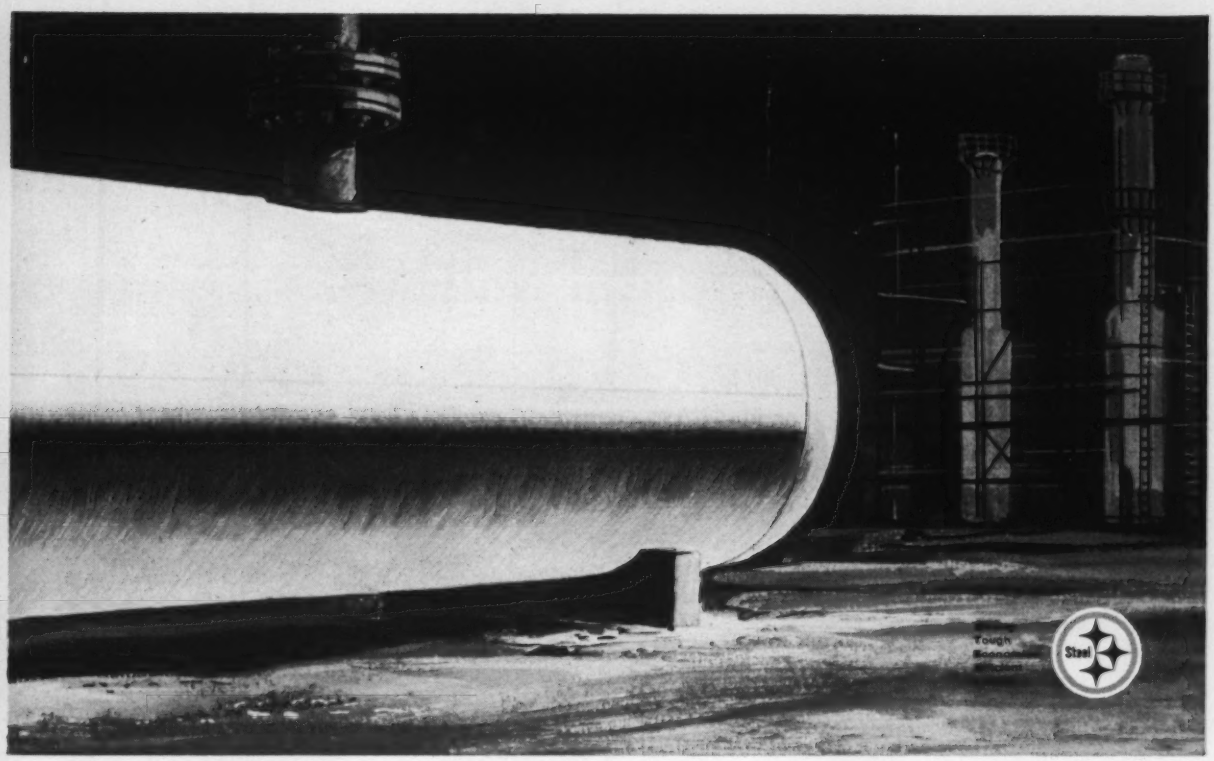
A.S.M.E. Approved

SSS-100 is approved for use in the construction of welded pressure vessels according to the requirements of Section VIII of the ASME Boiler & Pressure Vessel Code (Case No. 1298—Special Ruling).

Sheffield's New SSS-100 Meets

(Triple S-100)





Growing Need For Tougher Steel

Quenched and Tempered Alloy Constructional Steel With New Weight-Saving Strength—Greater Durability Under Punishing Loads—Excellent Weldability for Easier Fabrication.

Here it is! Sheffield's answer to the challenging need for steel with new qualities to meet the pressures of today's construction:

New Sheffield SSS-100	
Tensile Strength	115,000 psi minimum
Yield Strength	100,000 psi minimum
Elongation (in 2 inches)	18% minimum
Reduction in Area	50% minimum

SSS-100 may be furnished to requirements of ASTM A-300 at –50°F in firebox or higher quality levels.

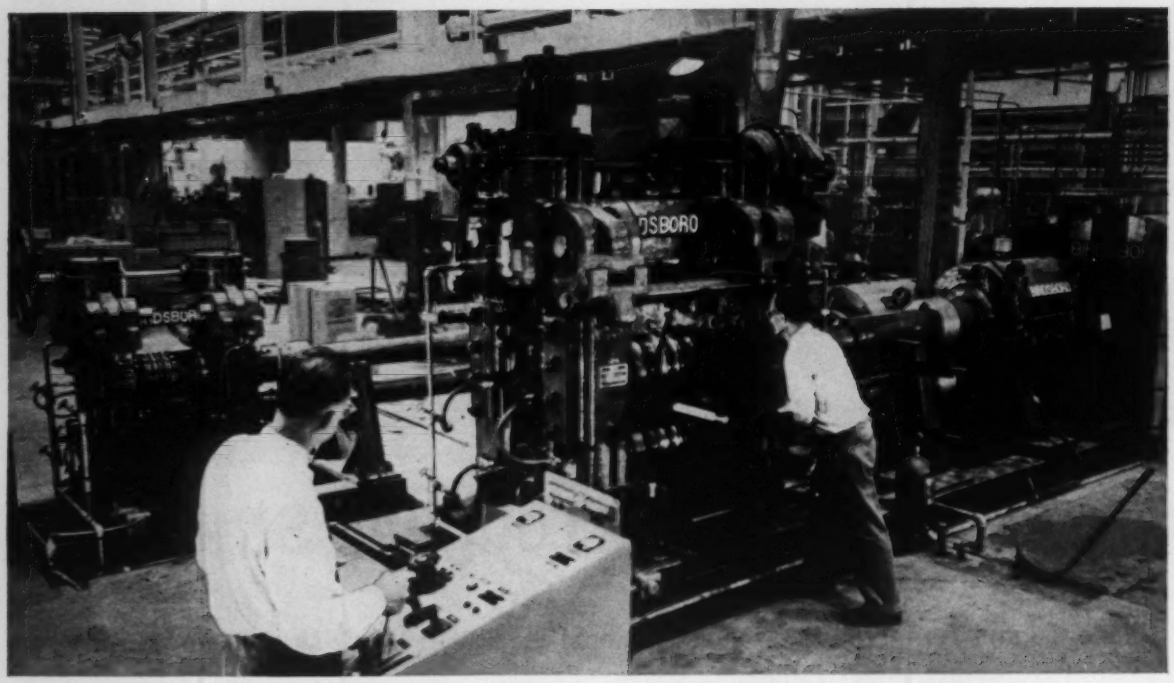
SSS-100 is the steel to specify—to demand—for storage tanks and pressure vessels, bridges, earth movers, heavy construction machinery, transport equipment, tank trucks, TV towers, fabricated structural shapes, missile ground-support equipment—any application that calls for a versatile combination of high strength, toughness and excellent weldability.

Sheffield SSS-100 is available in plates from $\frac{3}{16}$ to 2 inches thick, in blooms and billets for forging and subsequent heat treatment. Heat-treated bars can be furnished on inquiry. Also supplied heat treated to 321 minimum Brinell for use where resistance to impact abrasion is required.

For complete information and technical service, write **Sheffield Division, Armco Steel Corporation, Attention Alloy Sales, P. O. Box 3129, Houston 1, Texas.**

ARMCO Sheffield Division

New metals limber up for General Electric in BIRDSBORO experimental mill



To a manufacturer, today's miracle metals can be a dream come true . . . or a nightmare. General Electric finds out which—in advance—in this experimental laboratory. Here, scientists check out the unknown factors of these new metals by experimentation.

A laboratory feature is a Birdsboro 16"-10" bar mill. Custom designed to General Electric's specific requirements, it will help them explore new areas . . . and open new fields . . . in metals production. The Birdsboro men who designed and made this equipment are ready and willing to help you on your next mill machinery job. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM91-60

BIRDSBORO

CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

SIGMATIC

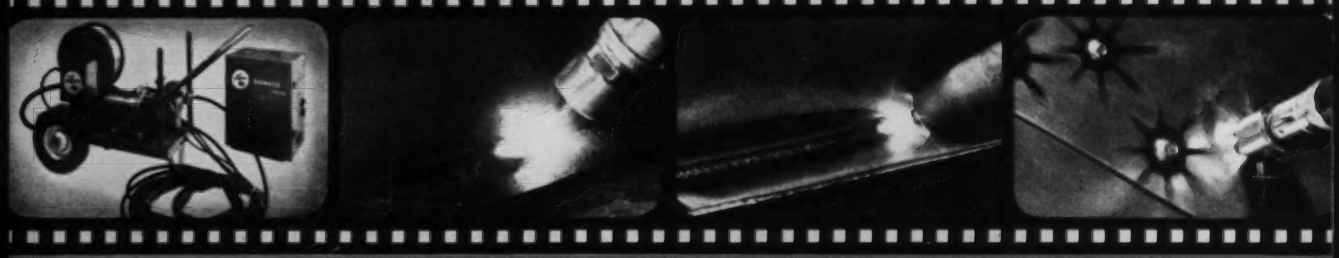
NEW ALL-IN-ONE "MIG" WELDING EQUIPMENT

Welding equipment is designed, developed and refined, but eventually it must be redesigned. LINDE'S new SIGMATIC line of "Mig" welding equipment is a product of this evolution . . . plus LINDE'S vast experience with more inert-gas and consumable-electrode processes than any other company in the world. The SIGMATIC line is the most-versatile semi-automatic equipment available anywhere—one machine for:

- **. . . all types of "Mig" welding—spray arc, short arc and spot welding**
- **. . . in all welding positions—vertical, overhead or downhand**
- **. . . with all shielding gases—argon, helium, CO_2, or their mixtures**
- **. . . and all wires—hard or soft, solid or tube**
- **. . . on all weldable metals—carbon steel, stainless, aluminum, magnesium, titanium**
- **. . . on all thicknesses—sheet metal and up**

See next page for details.

SIGMATIC



One SIGMATIC machine for... spray arc... short arc... spot welding

Spray arc, short arc, spot welding...never before combined in a single piece of equipment. SCC-8 control incorporates special spot-welding circuitry, featuring a directly-calibrated, precision weld timer and an independently-adjustable, "non-stick" timer. Converts from spot to continuous fusion welding at the flick of a switch. SEH-2 heavy-duty wire-feed unit—largest, most-rugged unit available today—permits positive feed of all "Mig" wire types, metals and diameters. The SIGMATIC line contains five basic units, designed with interchangeable parts permitting more than 50 combinations tailor-made to individual specifications. Available in cart-, sled- or bench-type units.

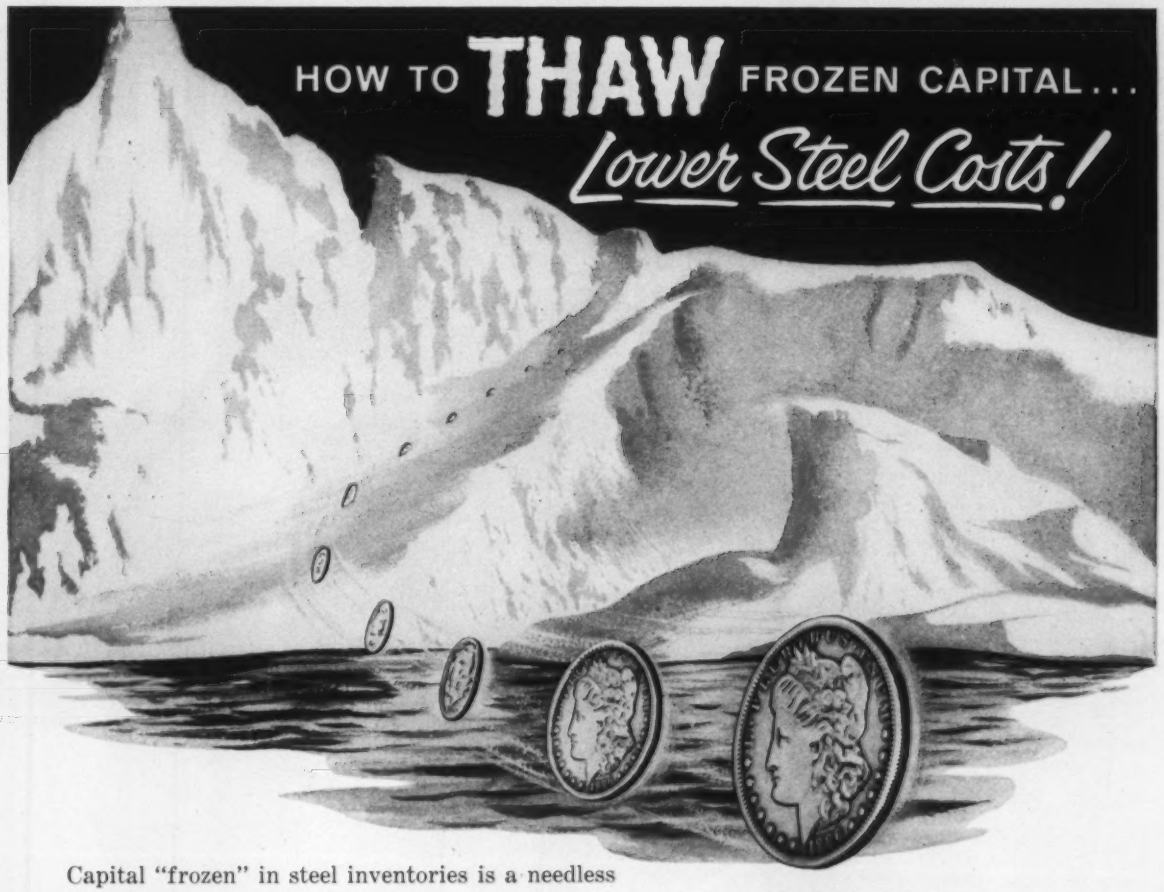
Unique controls are vastly simplified. All components are visible and accessible. Adjustments can be made with a screw driver. Only heavy-duty industrial-type parts are used throughout each unit to insure dependable, long-life performance with minimum maintenance. Top-quality parts—"Square D" pneumatic timers, Mallory electrolytic condensers, Cutler-Hammer switches, Potter & Brumfield relays, Electrons, Inc. thyratron tubes. The SIGMATIC line is unquestionably a major welding advance—with one rugged, durable machine, you can do any type of "Mig" welding in any position on any thickness of any metal. For more information or a live demonstration, call your nearest Linde office.

"Linde," "Sigmatic" and "Union Carbide" are registered trade marks of Union Carbide Corporation

LINDE COMPANY UNION CARBIDE

Division of Union Carbide Corporation
270 Park Avenue, New York 17, N. Y.

HOW TO THAW FROZEN CAPITAL... *Lower Steel Costs!*



Capital "frozen" in steel inventories is a needless expense...you incur additional costs as long as the steel remains in your possession. And, these costs must be added to the purchase price...to get the *true cost* of steel ready for use.

Review the check-list—use it to estimate the expense you save by having Frasse deliver the steel you need...on a job-by-job basis.

By working with Frasse stocks you get quick deliveries...broad selection...and technical assistance. You'll find this modern method of inventory management a definite convenience...and an economical way to have steel on hand...*when you need it.*

FRASSE

HELPS YOU AVOID THESE COSTS OF POSSESSION

- ☐ cost of Capital tied-up in Inventory
- ☐ cost of Space and Storage
- ☐ cost of Labor Handling
- ☐ cost of Scrap and Wastage
- ☐ cost of Obsolescence
- ☐ cost of Taxes and Insurance
- ☐ cost of Capital invested in Material Handling and Cutting Equipment

Peter A. Frasse & Co., Inc.

STEEL SERVICE CENTER INSTITUTE

STAINLESS STEEL • ALLOY STEEL • COLD FINISHED STEEL • ALUMINUM

New York 13, N. Y.	Philadelphia 29, Pa.	Buffalo 5, N. Y.	Syracuse 1, N. Y.	Hartford 1, Conn.
17 Grand St.	3911 Wissahickon Ave.	P. O. Box 102	P. O. Box 1267	P. O. Box 1949
WAlker 5-2200	BAldwin 9-9900	TR 6-4700	HOward 3-8655	JAckson 9-6861

CONCENTRICITY

MORGOIL

for the ultimate in rolling tolerance

New production methods and machining precision make possible a degree of bearing concentricity never before achieved. Extra care and accuracy in every step of manufacture give MORGOILS their ability to hold close rolling tolerances—under high loads and fastest speeds—with unmatched freedom from wear, fatigue and maintenance.

Seen through this 46" diameter Morgoil sleeve is the internal-external grinder specially designed for Morgoil manufacturing precision.

M3

MORGAN WORCESTER

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

ROLLING MILLS · MORGOIL BEARINGS · WIRE DRAWING MACHINES · COMBUSTION CONTROLS

Murder Story

Charles Butler & Co. is an old line fabricator, founded in 1894 by the present president's grandfather. Its plant is a picturesque edifice of the Victorian era. The factory grounds are beautifully maintained. Inside, the housekeeping is immaculate, and much of the machinery is of historical interest.

Charles Butler III, now president, is proud that he kept the union out for so many years. "I am just your custodian here," was his oft repeated message to employees. "Call me the butler."

He attributes the union's recent certification victory partly to the fact that the Internal Revenue Service disallowed the company's yacht as a legitimate business expense on the 1958 return. He, of course, had to give up the vessel, along with the July 4 and Labor Day cruises for workers and their families. As a result, they became disgruntled.

Since the three month strike last year, things seemed to be shaping up a little better with the union. But a wildcat in May gave an important contract to a competitor.

Although Butler & Co. had all the work it could handle last year, it lost money. Price fighting was rampant. Charles Butler had to take over himself as sales manager after his wife's brother let the price situation get out of hand. Lately, foreign competition has been increasingly troublesome.

Since Ed Johnson died four years ago, Mr. Butler has had trouble finding a good chief engineer. All the bright youngsters want to work in Arizona with electronic companies. Al Hart perhaps isn't as spry as a production superintendent should be, but you can't beat nearly 50 years' experience.

A drastic cost cutting program since the first of the year seemed to be helping. The sales promotion budget was cut to almost nothing. The purchase of welding equipment was delayed to 1962. Mr. Butler slashed pay of all salaried employees 15 per cent and tightened up on expense accounts.

Yet none of those steps really helped. Charles Butler & Co. filed for bankruptcy today.

Who was the murderer? The government? The union? Foreign competition?

No, the butler did it.

John S. Morgan

ASSOCIATE MANAGING EDITOR

GE range panels direct-on enameled with new Bethnamel sheets

85-90 pct acceptability on first fire • Boiling, fishscaling no problem

At its huge Range Division, Appliance Park, Louisville, Kentucky, General Electric is now using Bethnamel enameling steel in direct-on enameling of exposed front panels for 30-inch ranges.

DIRECT-ON PROVES SUPERIOR, LESS COSTLY

In producing 400 of these panels per day, General Electric has found commercial-quality, 22-ga Bethnamel sheets entirely satisfactory for the draw involved. Of vastly greater importance, GE has concluded that direct-coated Bethnamel is giving superior results, and substantially cutting costs.

They use the same titania-opacified enamel on the Bethnamel sheets that they use as a cover coat in their two-coat process. As one engineer says, "This enables us to change from two-coat to one-coat operation without missing a hanger on the spray-booth conveyor!"

NO BOILING, FISHSCALING; ADHERENCE SUPERB

Using the PEI standard adherence test impressions, GE has found no loss of enamel in the test area of single-coated Bethnamel. Surface abrasion and acid resistance of the cover coat have proved to be unaffected by the absence of a ground coat. Boiling and fishscaling have not even entered the picture. Bethnamel parts have rung up a record of 85-90 pct acceptability on first fire; and those parts which need reworking are easier to rework because no ground-coat patch is necessary.

BETHNAMEL COSTS NO MORE

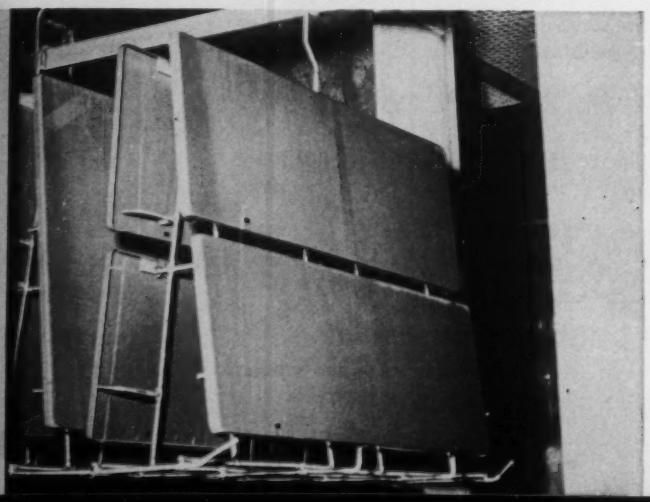
All these and other Bethnamel advantages can be yours, at a cost no higher than that of ordinary enameling iron. For further details, write to the address below, Room 1041, and ask for Folder 734.

Steel *for Strength ... Economy ... Versatility*

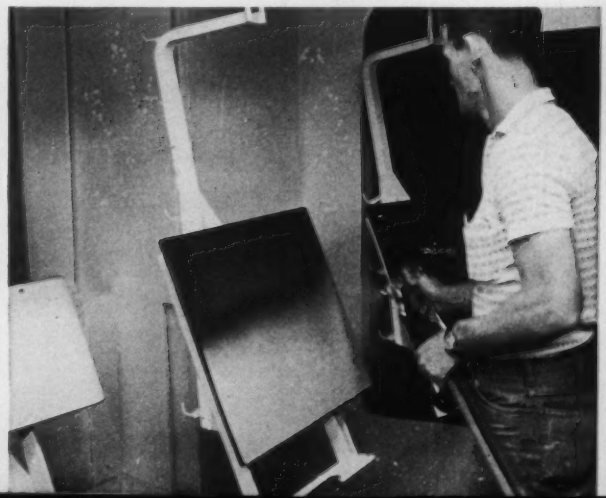
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

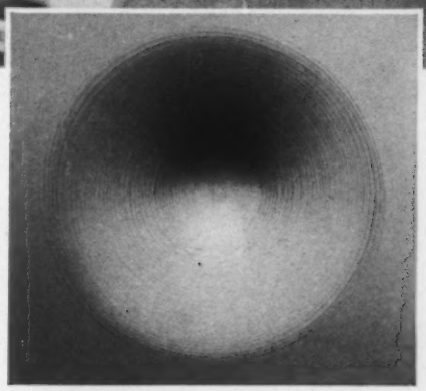
Front panels passing through pickle line. For direct-on enameling GE made simple modifications in pre-treatment. Here a ferric nitrate solution is the pickling agent, followed by a nickel strike (Ni range: 0.05-0.15 gr per sq ft).



General Electric uses the same titania-opacified frit in their direct-on enameling as in the two-coat operation. Because of Bethnamel's negligible carbon content, boiling and fishscaling have been no problem.



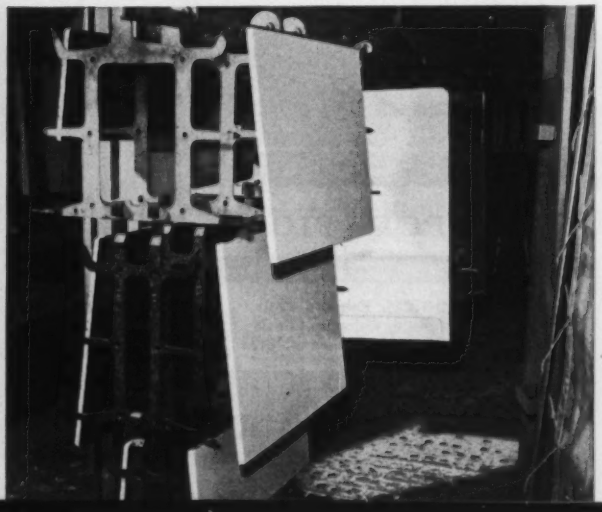
View of assembly line at General Electric's Range Division, Appliance Park, Louisville, Kentucky, where Bethnamel panels are mounted on 30-inch ranges.



Note the well-nigh perfect adhesion on this actual-size view of test panel made at GE's Appliance Park Range Division plant. Standard Porcelain Enamel Institute test was used.

BETHLEHEM STEEL

Direct-on Bethnamel panels are fired at 1450 deg F, for 4 minutes. At this temperature Bethnamel has consistently exhibited superior sag resistance.



Assembling and inspecting finished door panels. Acceptance of direct-on Bethnamel parts runs at an average rate of 85-90 pct on first fire.

For over 75 years steel has been poured into Valley Moulds, and now the new metals... used in space .... will also be poured into

VALLEY INGOT MOULDS

Steel

Support the STEELMARK

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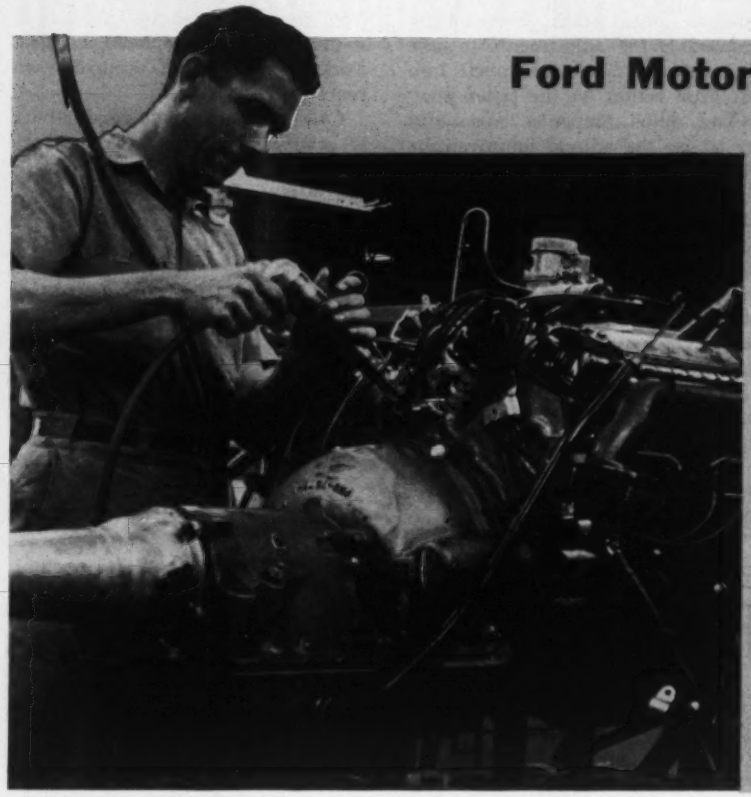


Ford Motor Co. Labor Costs

	Average Gross Hourly Earnings Per Hour Worked	Average Fringe Benefit Costs Per Hour Worked
1950	$1.78	$0.28
1951	1.97	0.36
1952	2.14	0.34
1953	2.24	0.32
1954	2.30	0.36
1955	2.42	0.35 (No SUB)
1956	2.48	0.48
1957	2.59	0.50
1958	2.74	0.59
1959	2.89	0.55
1960	3.00	0.59

Fringes Come on Top in Auto Talks

WATCH FOR the auto labor negotiations to boil down to a battle over fringes, despite all the talk last week about salaries for hourly workers.

The accompanying hourly earning and fringe benefit cost figures for Ford show that earnings went up 68.5 per cent from 1950 to 1960 while fringe costs jumped 110.7 per cent in the period.

• **Strategy** — That graphically proves that the United Auto Workers have already been working the fringes for all they were worth in previous negotiations. One reason: On the surface they don't appear as inflationary as direct wage increases. The union will try the same strategy this time.

All the auto companies, but Ford particularly, will try to hold the fringe increases to a minimum in 1961. Fringe costs include jury duty pay, vacations, holiday pay, insurance, pensions, social security, unemployment and workmen's compensation, and supplemental unemployment benefits (SUB). The last four are the most expensive.

• **Security**—The key issue from the union's standpoint is job security. The table on Page 72 shows why. Production employment among auto and truck makers has dropped 28 per cent since 1951. Even with a return to nearly full employment, many observers feel that the job total will never pass 600,000 again.

So UAW President Walter Reuther will want fringe provisions to cover that situation—more SUB, severance pay, job transfer allowances, and possibly retraining programs. Most of the proposals will hinge around broadening SUB.

• **SUB**—The UAW is demanding higher and longer SUBenefits, plus other security payments, such as retraining or severance allowances, that could be financed from the companies' hourly contribution. The effect may be to force a boost in the maximum funding position for SUB and an increase in the companies' ante—perhaps from the present 5 to 6 cents per man per hour.

On occasions, some of the automakers have reached the maximum funding position and have not had to pay the nickel. American Motors, at 129.2 per cent of the maximum, is

Employment Slides In Auto Industry

1951	708,000
1952	644,000
1953	767,000
1954	624,000
1955	746,000
1956	649,000
1957	630,000
1958	480,000
1959	574,000
1960	612,000
1961*	510,000

*Based on data for first five months.

in that position now. GM, at 97.8 per cent, and Ford, at 93.7 per cent, aren't far from the maximum. On the other hand, Chrysler is at 40.8 per cent.

• **Counterproposals** — Look for the companies to strongly resist any boost in the hourly contribution. But they may go along with a higher maximum, which would mean they would have to pay the 5 cents per hour longer.

The companies won't stand for any gains in security fringes unless they get relief from the cost-of-living (C-O-L) provision. Both Ford and Chrysler want to eliminate it. GM wants to curb it, but not necessarily do away with it (GM invented the clause and pride of authorship is involved). C-O-L has cost the auto companies 17 cents an hour, 7 cents of which was added in 1959 and 1960.

• **Decline in Escalators**—General Electric Co. and Westinghouse Electric Corp. abolished the provision in their negotiations. The steel industry put a ceiling on the increments and helps control costs by tying them to insurance expenses.

The lack of cost control is management's big argument against escalators. That holds whether the demand is for adjustments to pay or pensions. Look for much talk but little action on the latter now.

The auto companies may also try to use the annual improvement factor as a bargaining point to hold down fringe increases. Some management negotiators want the provision scaled down. At present, it gives workers a 2.5 per cent wage increase (6 cent minimum) annually as their share of technological improvements. But few would fight hard for its elimination because it also contains a provision allowing companies to introduce improvements without union interference.

• **Productivity** — Annual improvement involves the prickly issue of productivity. Neither side is as doctrinaire about the matter as the steel companies and the steel union, so don't look for the ideological fireworks in autos that occurred two years ago in steel.

One reason is that productivity is even more difficult to measure in the automotive industry than in the steel industry.

• **Summary**—At this moment, it still looks like we'll get a peaceful settlement at a net package cost of about 8 cents per hour per year in a two year contract. The emphasis will be on security fringes whose expense will be partly offset by union concessions, probably in the C-O-L area. Any deviation from a pattern settlement is most likely to come at American Motors, possibly in the form of a profit sharing plan.

Five Problem Areas Studied

THE PRESIDENT'S Labor-Management Committee has set up subcommittees to tackle its five thorniest study areas:

1. Collective bargaining.
2. Economic growth and unemployment.
3. Automation, productivity, and standards of living.
4. Foreign competition.
5. Sound wage and price policies.

• **Not of One Mind** — Although Henry Ford II, chairman, Ford Motor Co., and Walter Reuther, president, United Auto Workers, were at the meeting, the auto negotiations were not discussed, reported Labor Secretary Arthur Goldberg, chairman of the committee.

Each subcommittee is headed by a public member. Members disagreeing with the basic opinion of the subcommittee will be allowed to present their views to the whole committee. Some reports are expected to be ready when the committee meets again on Sept. 11.

Committee members include:

Collective bargaining — Chairman, David Cole, labor arbitrator; Dr. George Taylor, University of Pennsylvania; Joseph Block, chairman, Inland Steel Co.; Richard Reynolds Jr., president, Reynolds Metals Co.; Elliott Bell, McGraw-Hill Publishing Co.; David Dubinsky, president, International Ladies' Garment Workers; Joseph Keenan, International Brotherhood of Electrical Workers; Dr. Clark Kerr, University of California; and Mr. Reuther.

Economic growth—Ralph McGill, *Atlanta Constitution;* Arthur Burns, National Bureau of Economic Research; John Franklin, president, United States Lines Co.; George Harrison, Brotherhood of Railway Clerks; George Meany, AFL-CIO; Mr. Kerr; Mr. Bell; Mr. Reynolds; and Mr. Reuther.

Automation—Mr. Kerr, chairman; Mr. McGill, Mr. Cole, Thomas Watson Jr., president, International Business Machines Corp.; Mr. Ford, Mr. Franklin, Mr. Keenan, David McDonald, United Steelworkers of America; and Thomas Kennedy, United Mine Workers.

Foreign competition—Dr. Burns, chairman; Dr. Taylor, Mr. McGill, Mr. Bell, Mr. Watson, Mr. McDonald, Mr. Kennedy, Mr. Meany; and J. Spencer Love, chairman, Burlington Industries Inc.

Wage and price policies—Dr. Taylor, chairman; Dr. Burns, Mr. Cole, Mr. Love, Mr. Block, Mr. Ford, Mr. Harrison, Mr. Meany, and Mr. Reuther.

Unemployment Tempers Buyers' Mood

"CAUTIOUS OPTIMISM prevails among U. S. consumers. But don't look for increased consumer purchases to pave the way for a vigorous and enduring upturn in the economy, unless concern over unemployment can be dissipated."

That's how George Katona and Eva Mueller, directors of the consumer attitudes survey for the University of Michigan, summarize their latest quarterly survey. Highlights of the report:

1. Most people realize that business trends have turned up and they anticipate further improvement.

2. Plans to purchase automobiles, especially new cars, in the fall are mentioned more frequently than a year ago.

3. An awareness of substantial unemployment and concern over its persistence are tempering consumers' optimism.

The survey, conducted by the University of Michigan's Survey Research Center, was based on a cross section of about 1300 people. Reflecting the slow rise in consumer optimism, the center's over-all Index of Consumer Attitudes rose to 95.0 from 91.7 a year ago. It still stands well below the 100.2 recorded in May and June, 1959.

Consumers indicated concern when asked whether they thought unemployment would increase or decrease in the next 12 months. Nearly 51 per cent felt it would increase or remain the same.

Only 48 per cent of the respondents felt that business conditions would be better a year from now.

How Consumers View Economic Climate

	Good Time To Buy	Uncertain; Depends	Bad Time To Buy
CARS			
May, 1961	44%	42%	14%
Nov., 1960	40%	40%	20%
HOMES			
May, 1961	42%	28%	30%
Nov., 1960	35%	31%	34%
LARGE HOUSEHOLD GOODS			
May, 1961	45%	38%	17%
Nov., 1960	42%	39%	19%

• **Spurt in Autos?**—While interest in used cars has declined, an unusually large portion of the consumers planning to buy new cars said they would do so in the fourth quarter of this year.

A persistent interest in compact cars was again reflected in the latest survey. But the proportion of people indicating they felt that auto prices were unreasonable or that prices would go up in the near future was lower than in the last two years.

The number of people planning to purchase houses was somewhat higher than a year ago, but still substantially lower than in June, 1959, reports Mr. Katona. But complaints about difficulties in financing new homes were voiced less frequently than last year.

Intentions to carry out improvements, additions, or repairs to homes were mentioned with the same frequency as last year and considerably more frequently than two years ago.

Plans to purchase major electrical appliances remained fairly low, especially in the lower and middle income groups.

Freight Car Fleet Called Inadequate, Outdated

"THE ROLLING STOCK of this country's railroads is in the poorest condition since the depression days of the 1930s ... and (is) not prepared to meet the imminent needs of a resurgent national economy," charges Walter A. Renz, executive vice president, American Railway Car Institute.

Mr. Renz points out that the fleet of Class I railroads (1,650,000 cars) has shrunk 5 per cent in the last dozen years while the gross national product has nearly doubled. Freight cars are being scrapped more than twice as fast as they are being replaced. Making the situation worse, about 10 per cent of the cars retained in the fleet are unfit for use. Some railroads have as many as 32 per cent unfit cars.

"Industry is going to feel the pinch," warns Mr. Renz. Shippers are complaining about the shortage and poor quality of cars. Recalling a situation of several years ago when grain had to be piled on the ground because of the lack of cars, he says today's shortage will affect many commodities.

Carbuilders can turn out 10,000 cars a month. They have a backlog of only 4000 cars—less than two weeks' production.

What You Should Know about

TRADE WITH THE SOVIETS is always a controversial topic. Public reaction is influenced largely by existing conditions in the cold war. This reaction may become so adverse as to make it unadvisable for a firm to attempt trading with the Reds. Adverse public opinion can become a weapon for labor unions. On the other hand, some firms have been labeled "pioneers" for seeking to further peace through trade with the USSR.

Some U. S. businessmen have found the USSR a fairly good market for their products (see STEEL, Aug. 29, 1960, and Mar. 6, 1961). Transactions are not too difficult to arrange and, although they are shrewd traders, the Soviets have a good reputation for prompt payment and generally comply with contract terms.

The editors of STEEL neither advocate nor discourage trade with the Reds. But because the Soviets do offer an avenue of trade, the U. S. businessman should be aware of several things before doing business with them. For this reason we are presenting some of the findings highlighted in the book, *U. S.-Soviet Trade, Facts for the Businessman's Appraisal.*

It is a study made by eight students doing graduate work in the Harvard Graduate School of Business Administration. "The purpose of the book," says T. P. Muchisky, group leader of the project, "is to present a factual picture of the problems, opportunities, and risks involved."

This review deals chiefly with exports because imports of metalworking items from the Soviets have declined to a trickle.

Trade Research Associates is a partnership of eight graduates of the Harvard Graduate School of Business Administration. Their book, **U. S.-Soviet Trade, Facts for the Businessman's Appraisal** ($18.50—Box 5616, Cleveland 1, Ohio), compares methods of trading with the Soviets and provides a comprehensive view of the Soviet business structure.

Shown above (left to right): T. P. Muchisky, group leader; J. L. Hesburgh, S. A. Shaw, W. H. Campbell, and J. E. Dittrich. Other partners (not pictured) are G. F. Menkick, D. D. Niblo, and J. M. Wilson Jr.

The Soviets offer poor patent right protection because all new ideas or devices are considered to be state owned regardless of the source. A firm may find itself competing against machinery it sold a Soviet manufacturer and receiving no compensation.

A prospective big deal with the Soviets may turn into a blind alley. On some occasions, the Reds have requested sample commodities or ordered token amounts which were then used as copies for production. It should be remembered that the USSR is capable of being self-sufficient and uses foreign trade to hasten the time when knowhow and production capacity are adequate for the country to satisfy its own needs. The Communists regard foreign trade as an instrument to strengthen or weaken the economies of other nations. As Khrushchev has said, "We value trade least for economic reasons and most for political reasons."

Soviet foreign trade is conducted by state agencies only and it is part of a comprehensive economic plan which, in stressing self-sufficiency, maintains close watch over imports and exports. Foreign trade is controlled by the Ministry of Foreign Trade, which heads a structure of trade organizations (combines). Each combine operates in a clearly defined product area. Staff functions such as establishing links with foreign economic institutions and organizing trade fairs are performed by the All-Union Chamber of Commerce.

Attention must be given to each detail when preparing a contract with a Soviet organization. The contract should include the names of the parties concerned, the commodity being traded, detailed quality specifications, price considerations, shipping dates and ports, insurance provisions, and an arbitration clause.

The extremely essential arbitration clause should specify a neutral country in which arbitration would take place or may provide for a committee comprised of one Soviet and one U. S. company representative

Trading with the Soviets

and a chairman selected from a list of international arbitrators.

Methods of Trade

Trade with the Soviets may be conducted in any one of three ways:

1. Through intermediaries which can handle some or all of the processing.

Amtorg Trading Corp., New York, was chartered in the U. S. to facilitate Soviet trade. It is Soviet owned and operates as an agent of the Soviet Union and the combines since the U. S. does not admit an official Soviet trade delegation. Staffed mainly by Soviet personnel, Amtorg offers unique advantages because it has many contacts in the USSR and is capable of processing most of the details involved in a transaction. It handles over half the volume of U. S.-Soviet trade. As an agent of a foreign principal, Amtorg must submit semiannual reports to the Department of Justice. All financial transactions are described in detail and become a matter of public record. Some firms have learned the hard way that dealings which they desired to be kept confidential should not have been conducted through Amtorg.

Import-export brokers negotiate transactions but assume no financial responsibility.

Import-export merchants purchase goods on their own account, absorbing some of the risk, providing service on most of the processing.

Commission houses are similar to import-export brokers but they also handle the physical transfer of goods, customs clearance, and accept payment for the goods.

2. With a Soviet foreign trade organization (combine). Write or cable the manager of the appropriate combine (in English). Names and addresses may be obtained from Amtorg or the U. S. Department of Commerce. A reply may take from two weeks to several months depending on interest in the proposed transaction. The method is recommended in cases concerning complicated goods.

3. Through international markets such as auctions, exchanges, fairs, and trade exhibitions. Soviet representatives there can initiate transactions.

Notes for the Exporter

1. Contact the Bureau of Foreign Commerce, U. S. Department of Commerce, to learn the regulations governing the particular product to be exported. It will provide information on goods which cannot be exported to the USSR, goods which the USSR wishes to import, customs regulations, licensing procedures, services rendered by brokers and agents, and other general information and advice.

2. Contact the Soviet purchaser or his agent to make preliminary arrangements.

3. Obtain a specialist's counsel on the legal aspects of Soviet trade.

4. Financial arrangements may be made through any large bank with a foreign trade department.

5. If a loan is needed, the Department of Commerce can arrange contacts for obtaining one. The Export-Import Bank of Washington can issue exporter credits. Note: The Johnson Act prohibits extension of long term credit to the Soviet Union, and most banks are reluctant to advance credit to firms dealing with the Soviets.

6. Insurance arrangements are complex and can be handled best by an experienced maritime insurance broker.

7. Shipping arrangements are also complex. Most ships sailing from the U. S. do not go to Soviet ports, so Antwerp, Belgium, and Helsinki, Finland, are often used as transfer points. A foreign freight forwarder should be retained to handle the transfer unless an intermediary is taking care of these and other details. Parcel post may be used for exporting. This requires completion of a series of customs forms (available at all post offices).

8. Packaging can be a substantial cost factor and details should be worked out before settling on a final price for the goods. Protective covering and packaging devices vary with the nature and amount of goods shipped. Banks, shipping firms, and insurance companies can recommend an expert packaging company if assistance is needed.

9. Licensing is affected by export regulations which are subject to continual change and are quite involved. Consult *The Comprehensive Export Schedule* of the Department of Commerce. There are two types of licenses: (a) General license—it permits export of goods within general limitations. No application is required; no license document is issued. (b) Validated license—it authorizes export of certain goods. Formal application must be made to the Bureau of Foreign Commerce and must be supported by a firm order for the goods.

10. Customs regulations require filing a shipper's export declaration with the collector of customs at the port of exit or the postmaster if the shipment is sent by mail. The declaration must contain a description of the shipment. One is required for most exports, even those which do not require a validated license.

11. Foreign advertising within the USSR is under the jurisdiction of V/O Mezhdunarodnaya Kniga, Moscow G-200. Advertising is accepted by about 60 mag-

azines, most of which are trade publications read by specialists in engineering and economics. Although it may not be too effective at the consumer level, advertising can influence factory managers and planning groups to recommend the purchase of certain foreign products.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

$1.7 Billion Contracts Aid Unemployment Areas

FIRMS in 252 of 289 areas of substantial unemployment received federal contract awards totaling $1.76 billion during the January-March quarter, reports the Department of Commerce. During the previous quarter, awards of $454 million went to firms in 160 of the 174 depressed labor markets.

Getting the bigger shares for supplies, services, and construction were: Los Angeles-Long Beach, Calif., $292 million; San Diego, Calif., $220 million; Detroit, $128 million; Philadelphia, $127 million; Lawrence-Haverhill, Mass., $71 million.

Steel Production Rise Outstrips Job Pickup

WHILE weekly steel production rose 13 per cent between February and April, employment in the industry increased 2 per cent, reports U. S. Department of Labor's Bureau of Employment Security.

A manpower survey of 139 plants (they employ about 95 per cent of the industry's workers), showed an employment of 454,500 in February.

The bureau also observes: "The substantial employment decline of 149,000, or 25 per cent, noted during the year ending February, 1961, remains largely unrelieved." The industry expects to add 25,000 workers by August, a gain of about 5.8 per cent.

"Automation and other technological changes contributing to improved output, such as the added use of oxygen lances in open hearth furnaces, are expected to limit the pace at which industry workers are recalled," the report states.

Welding Industry Sees

WELDING equipment sales are on the way up. The general tone of the market is sounded by W. H. Hobart Jr., assistant secretary-treasurer, Hobart Bros. Co., Troy, Ohio: "We anticipate a 10 per cent increase in sales volume in 1961 over 1960 due to increased sales efforts, new products, and personnel training."

Most respondents to a STEEL survey of welding equipment makers agree with Mr. Hobart. Here's how they forecast trends in key business indicators:

	Up	Same	Down
Price Changes (Last 12 months)	10%	76%	14%
Price Changes (Next 6 months)	29%	71%	
Inquiries (1961 vs. 1960)	58%	19%	23%
Sales (1961 vs. 1960)	62%	19%	19%
Profit Levels (1961 vs. 1960)	42%	37%	21%
Profit Margins (1961 vs. 1960)	32%	42%	26%

R. Bruce Wall, secretary-treasurer, Resistance Welder Manufacturers' Association, Philadelphia, says business trends in his industry have been downward in the last three or four months, but he sees evidence of an increase in June. Inquiries have been active, he says.

• **Price Conflict** — Some company officials find themselves married to, but not loving, price lists established in the mid-1950s. There have been minor changes in prices during the last 12 months, and a few are slated over the next six months. Most have been small, isolated adjustments on equipment, components, and supplies. Charles N. Aronson, president and chief engineer, Aronson Machine Co. Inc., Arcade, N. Y., cites this as being typical: "We had held the price line on our turning rolls from 1956 to just after the first of this year. Our costs had risen steadily, and we could no longer stand the squeeze."

The cost-price profit squeeze, combined with the recession, has brought on another specter that haunts producers. Price fighting ranks at the top of the list of major problems. Several executives echo this comment from W. H. Carrigan, vice president and general manager, Kirkhof Mfg. Corp., Grand Rapids, Mich.: "The major problem our industry faces is price fighting, which has been prevalent in the last 12 months." B. E. Long, president, Cayuga Machine & Fabricating Co. Inc., Depew, N. Y., adds: ". . . price cutting by those building low quality equipment." Other problems:

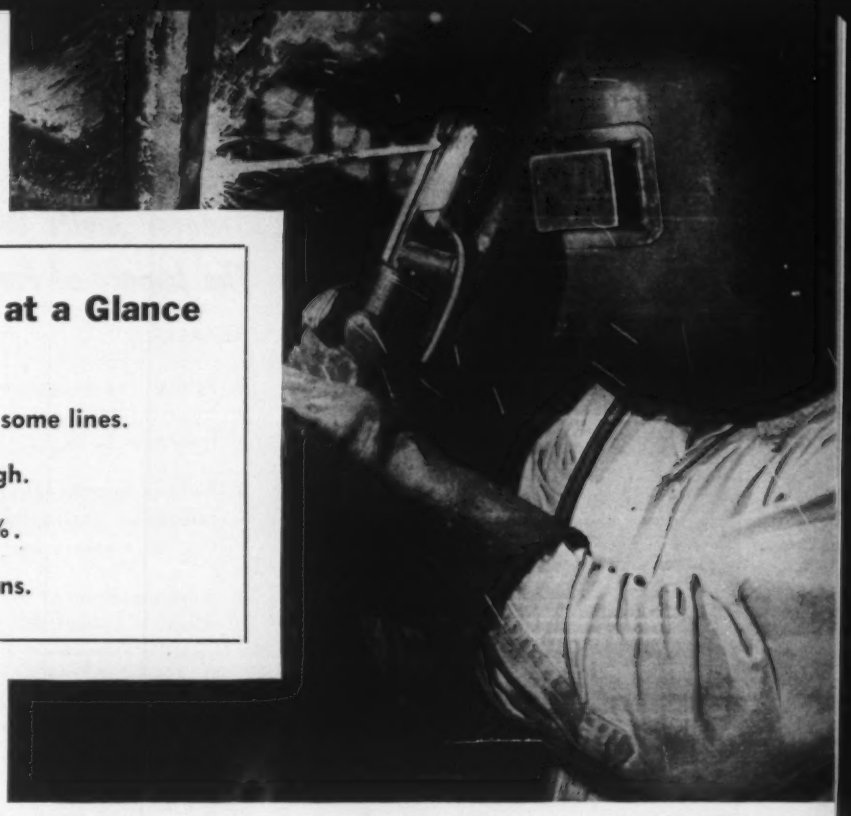
• **Give and No Take**—All the time, talent, and expense factors involved in engineering and presenting a proposal for special machinery are cited by Paul Galton, general manager, Ransome Co., a division of Big Three Welding Equipment Co., Scotch Plains, N. J. "This is our business, sure," says Mr. Galton, "but somebody must pay for this expense . . . Certain areas of the machine tool industry have solved the problem by requiring a proposal service charge for all special applications—perhaps that will be the answer for our industry."

• **Costs Hurt** — "The most serious problems are inflationary trends in terms of increasing labor costs, material, and overhead items," says Sciaky Bros. Inc., Chicago. Federal-Warco Div. of McKay Machine Co., Warren, Ohio, asserts: "Competition is high—we must reduce manufacturing costs."

The real bind is in not being able to pass on increased costs to the customer, comments L. W. Stettner, president, Victor Equipment Co., San Francisco. A possible result is cited by W. R. Plummer, president, Allied Welder Corp., Detroit: ". . . The ever increasing cost of material and labor will eventually force our industry to either abandon our foreign markets, or set up plants outside the U. S."

• **Education Needed**—"We face the problem of fostering acceptance by buyers of a slightly higher price for a great deal more value," says

Sales Pickup



Welding Equipment at a Glance

(1961)

- Price hikes ahead on some lines.
- Inquiry levels are high.
- Sales will be up 10%.
- Profit outlook brightens.

Mr. Aronson. "One breakdown in production often costs more than the whole purchase price of inadequate equipment. In the welding dollar, only 2 cents is electricity, 4 cents welding machine, 8 cents electrode and wire, and 86 cents is labor and overhead. The chances of making any appreciable reduction in the first three are mighty slim. But, in using positioners, the 86 cents is almost always cut in half, and production is increased. . ."

Another comment: "The industry is moving ahead rapidly and it's easy for companies to get out of touch with current methods," says N. S. Strandwitz, equipment sales manager, National Cylinder Gas Div., Chicago, Chemetron Corp. Other factors: "There's a lack of knowledge among designers concerning good welded design," notes C. G. Herbruck, assistant secretary, Lincoln Electric Co., Cleveland. He also says the lack of qualified welders is restricting the use of structural welding in many parts of the country. Another problem lies in the conflicting and confusing codes for welding—they need simplification and standardization, he says. His last point: Lack of confidence in welding by designers and engineers leads to overwelding, overinspection, overdesigning, and restrictive practices, all of which generally result in higher costs.

From the standpoint of Pandjiris Weldment Co., St. Louis, the most important problem is that no standards are set by the industry or customer . . . "Almost all fusion welding positioning equipment is custom built," says E. J. St. Eve, vice president, sales.

• **Profits Critical**—"The most serious problem (is) profit margins," says F. X. Neary, manager of merchandising, Welding Div., Buffalo, Westinghouse Electric Corp. "The cost of equipment and consumables has not accelerated with the rest of the economy since World War II . . . placing a severe strain upon the resources of the manufacturer, limiting research and development, new investments, and technology. . ."

• **Applications, Equipment** — Linde Co., a division of Union Carbide Corp., New York, has come out with a number of new products and developments resulting from its $3.5 million annual R&D program. Harry E. Rockefeller, general manager, electric welding, cites Short Arc welding of pipe; machines for fabricating 4 to 36 in. carbon steel pipe; plasma arc equipment for close tolerance, automated welding; equipment for plasma arc cutting of carbon steel which will equal oxy-acetylene cutting quality and retain superior speed advantage; improved techniques for semiautomatic welding, particularly on carbon steel and high melting point materials.

Other developments: Semiautomatic spotwelding equipment for light gage welding in fabrication processes (Marquette Mfg. Co., Minneapolis, a division of Marquette Corp.) . . . Limited overlap seam-welder for certain continuous strip mill operations (Taylor-Winfield Corp., Warren, Ohio) . . . Electrogas process equipment for automatic single pass, vertical, CO_2 welding of plates $\frac{1}{2}$ to 2 in. thick (Arcos Corp., Philadelphia) . . . Higher production spikewelding equipment for the transistor and semiconductor field (National Electric Welding Machines Co., Bay City, Mich.) . . . Light gage studwelder for applying insulation to ductwork, headed concrete anchors to join steel members to concrete—used in missile base silos (Gregory Industries Inc., Lorain, Ohio).

Senator Javits Wants to Cushion The Impact of Foreign Competition

HE SEEKS:

1. **Loans, tax incentives, and technical assistance to business to meet foreign competition or diversify into new lines.**
2. **Federal supplemental unemployment compensation, relocation assistance, early retirement, and retraining for workers hurt by foreign competition.**
3. **Abandonment of the concept of helping a total industry. Substitute: A direct aid program aimed at specific companies and communities.**

Foreign Trade Policy Debate Boils

LOOKING AHEAD to the certain fight next year in Congress over the extension of the Reciprocal Trade Agreements Act, Sen. Jacob K. Javits (R., N. Y.) has demanded that President Kennedy summon up "the courage and the initiative" to deal with the problem of import competition dogging U. S. industry.

The senator, long a friend of free trade principles, is worried that protectionist sentiment is growing so rapidly throughout the country that the trade act may not be extended next year. He implies that protectionism is growing because of the President's failure to come up with new policies to protect U. S. industry. The senator is not calling for quotas or tariffs, but he is obviously afraid his colleagues in Congress are headed that way, unless the White House quickly solves some tough problems.

● **TAKE LEAD AND ZINC**—At least twice, the Interior Department has promised to appear before Congress to testify on lead and zinc legislation, but administration spokesmen have failed to show at scheduled hearings of the House Interior Committee. Another hearing is scheduled for July 25, following the announcement of a White House proposal to buy $60 million worth of lead and zinc from the domestic market to take the pressure off prices (STEEL, July 3, p. 92).

The liberal Republican thinks the administration must start now to solve such problems. Otherwise, the benefits of an increased foreign aid program will be lost as the rest of the world rushes to raise more trade barriers against U. S. products in fear of the growing U. S. protectionist spirit.

● **YEAR LONG DEBATE**—Senator Javits proposes a year of debate on our foreign trade policies in newspapers and magazines, on television and radio . . . "a debate that should surely overshadow even the great tariff debates of the 1800s, because the issues are much greater and the consequences much graver today than ever before." He sets up these five basic guidelines for debate:

1. The Soviet trade offensive threatens to draw even some of the industrialized nations of the Free World into dependence on Soviet trade.
2. Economic regionalism in Europe and South America cannot be stopped. It challenges our ability to compete for foreign markets.
3. No permanent solution has been found for the U. S. balance of payments problem or the outflow of gold.
4. The industrialized Free World must provide adequate markets for the raw commodities of the underdeveloped nations. Otherwise, those nations will seek Communist markets.
5. Business health is increasingly dependent upon a rising rate of exports.

Meanwhile, Senator Javits has another bill in the hopper designed to promote exports, proving his good intentions as far as free trade is concerned. He favors a system whereby the President would have the power to cut tariffs on imports over a seven year period.

FOUR STRAND ROD MILL ROLLS RECORD

Providing a significant breakthrough in technical ceilings by rolling four strands at 6000 fpm, Morgan's No. 1 rod mill in the Cuyahoga Works of United States Steel Corporation's American Steel & Wire Division, Cleveland, Ohio, has been setting output records ever since start-up. Such outstanding productivity results from advanced engineering concepts incorporated in every Morgan design to assure maximum profitability through long years of service.

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551 TONS PER TURN FOR 83 CONSECUTIVE TURNS

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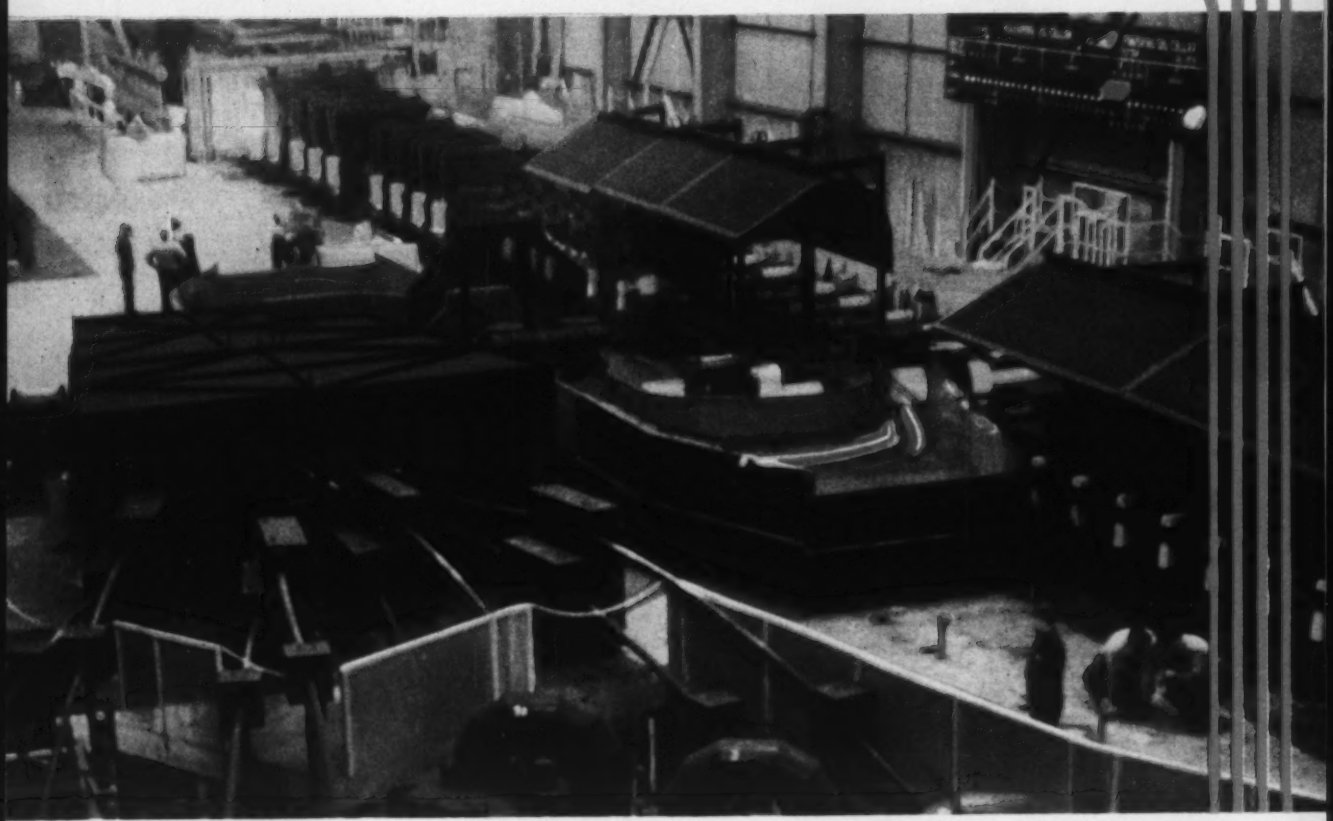
11,399 TONS IN A WORK WEEK



MORGAN WORCESTER

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

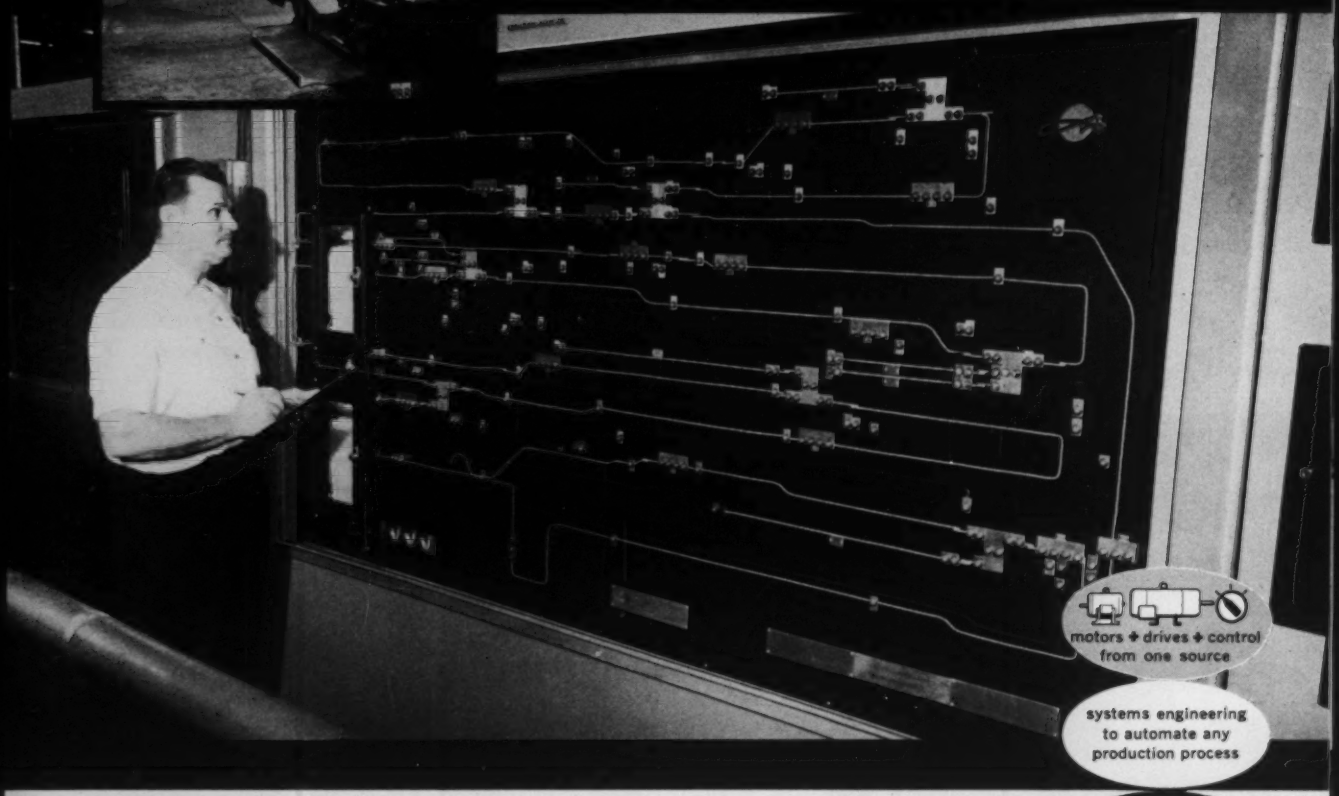
ROLLING MILLS • MORGOIL BEARINGS • WIRE DRAWING MACHINES • COMBUSTION CONTROLS

R2 © 1961

FROM INITIAL BODY ASSEMBLY—Louis Allis controllers coordinate the intricate assembly of side-gate framing fixtures and underbody just prior to welding by synchronizing the arrival of three components from three different locations at precisely the same time . . .

TO PRE-FINAL ASSEMBLY AREA—where a bank of Louis Allis controllers regulate the drives powering the mating line where unitized body, stub-frame / engine assembly and running gear are assembled into units like the Plymouth convertible shown coming off the assembly line . . .

AND 3-DIMENSIONAL AREA CONTROL CENTER — which monitors conveyor operations. Any type of production interruption is quickly revealed and identified by signal light indication. Recorders provide a permanent daily record of each conveyor's operation.



motors + drives + control from one source

systems engineering to automate any production process

LOUIS ALLIS engineered systems automate Chrysler assembly lines

An automobile assembly line is a materials handling complex of movement and synchronization. Feeder lines joining the main-line must deliver components on time — and in perfect synchronism. Still, the system must be flexible enough to accommodate speed changes when desired.

The Plymouth assembly plants in Detroit and St. Louis are models of this type of automation . . . and electrical components for the materials handling systems were custom-engineered by Louis Allis. L. A. systems engineers worked with Plymouth engineers to map the flow sequence. Louis Allis provided the adjustable speed drives and precision controls to operate the systems and supervised the installation. The result: integrated, automated systems that eliminate time loss, manpower waste, and excess materials handling costs.

Synchronized conveyors operate at pre-set speeds by following built-in master job-rate controllers. The system provides for automatic, position-perfect transfer of body components from one conveyor to another. A three-dimensional area control center monitors and records all conveyor operations.

If your plans call for automation, contact Louis Allis for systems engineering assistance — and single-source responsibility of drive and control design, manufacturing, and service. Call the Louis Allis District Office nearest you, or write to The Louis Allis Co., 471 East Stewart Street, Milwaukee 1, Wisconsin. Ask for Bulletin 2900.

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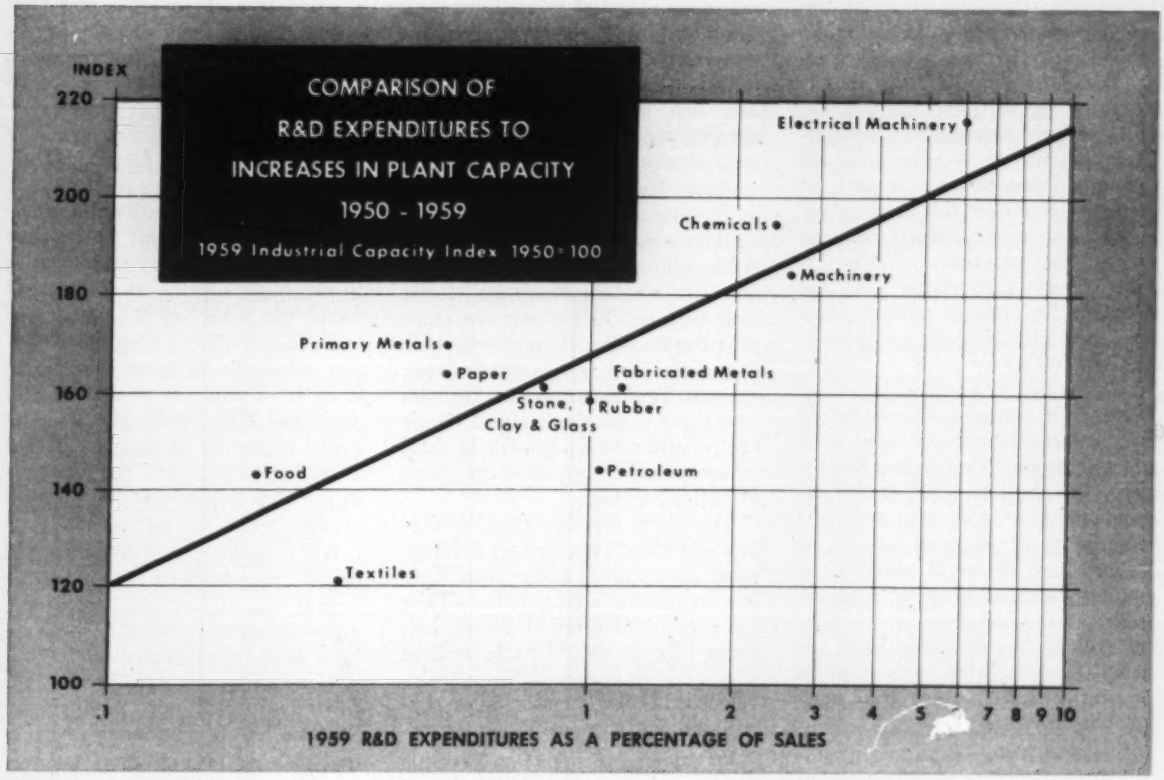


Source: Booz, Allen & Hamilton.

Invent for Profit Growth

THE headline read:

NAGGING WIFE DRIVES INVENTOR TO FORTUNE

The story: Loyal Tingley's wife, Jane, griped incessantly about going to the basement to add a water conditioner to her laundry during the automatic washer's rinse cycle. (The conditioner helps rinse detergent out of clothing.) So Mr. Tingley, an obedient husband with tired eardrums, dutifully fashioned a gadget from pie tins, a coffee can, and a tuna fish container which dispensed the water conditioner automatically.

Mrs. Tingley was so elated with the contraption that her husband decided to market it. He was given the chance to show his gadget to Judson Sayre, chairman of Borg-Warner Corp.'s Norge Div., after a couple of unsuccessful attempts to see the right people in other firms. Mr. Sayre saw customer appeal in the tin cans; Norge's engineers designed a sleek production model; the device helped market washing machines; and Mr. Tingley has earned royalties that are in the high five-figure category.

• **Somebody Goofed**—That homely story illustrates five points: 1. Seldom is a product successful unless it fills a real human want. 2. Many engineers (the type Mr. Tingley saw in other firms) don't have—and probably can't be expected to have—the kind of vision it takes to see a marketable product in an offbeat new idea. 3. Top management must, for profitability's sake, always be alert to new ideas, see end use benefits in them, and know how the customer will react to those benefits. 4. Managers must be willing to take chances when they think the odds are with them. 5. There's no "one best way" to come up with new ideas, so the aggressive company will devise a way to cover all the important bases—and never set up a barrier against the occasional offbeat approach.

As Peter G. Peterson, president, Bell & Howell Co., told the American Marketing Association's conference last month: "In the insurance business, we find successful companies insuring the uninsurable and thinking the unthinkable—

challenging tradition. But even if there weren't so many cases where unconventional thinking pays off, I believe that the very nature of the markets of the sixties would make management restless. As we look to the $800 billion economy that is predicted for 1970 and the increase of 40 per cent in consumer expenditures that will be required to reach that goal, management can well be restless about how this tremendous number of new products will be created and marketed. With this kind of new product log jam, the premium for brilliant product planning will obviously go up geometrically."

• **Need for Newness**—Never before has metalworking been faced with the new product challenge it has today. On the one hand is the supreme need for innovation—to combat the profit squeeze, to win a bigger share of world markets, to counter the trend of metal products getting a smaller share of the buying dollar. On the other hand are today's unparalleled opportunities to turn new knowledge into marketable new products.

Examine, for a minute, your company's potential new products in these booming areas of technology alone: Ultrasonics, cryogenics, thermoelectricity, molectronics, data processing, nucleonics, electroluminescence, thermionics, fuel cells, powder metallurgy, explosive metalworking, sensing devices.

Or approach it from the standpoint of growing markets such as these: Leisure, teen-agers, travel, education, cultural activities, space, salt water conversion, miniaturization, automation, containerization, do-it-yourself—the list is endless.

But too few companies have attempted to capitalize on the new knowledge and the new markets. Why, for example, are we just now developing the initial products based on thermoelectricity—a phenomenon discovered 140 years ago?

Much of the answer can be found in these six statements: 1. Top management hasn't been willing to gamble enough. 2. Management hasn't kept itself closely enough attuned to sociological trends that lead to economic opportunities. 3. Management has too seldom adopted a planned approach to innovation. 4. Too many engineers and scientists (and other managerial and professional people) suffer from "alley sight"—they can't see the broad range of possibilities in a new idea. 5. The new product development process has been permitted to become too inefficient. 6. Too few managers are mentally keeping pace with the rapid rate of technological change.

Those errors must be corrected; most manufacturers cannot live without new products. Booz, Allen & Hamilton, consulting firm, points out that it's "commonplace" for a firm to have 50 per cent or more of current sales in products that were developed within the last ten years. The firm adds: "In the next three years alone, about 75 per cent of the nation's growth in sales volume can be expected to come from new products."

The firms that are pouring dollars and effort into product development are growing faster than their less aggressive counterparts. Take the case of 85-year-old Bissell Inc. From 1876 to 1957, its sole product was a carpet sweeper. Then it developed 12 new items. Sales skyrocketed 500 per cent.

Or examine the chart on Page 81. It shows that the industries with the big research efforts are the ones with the big growth trends.

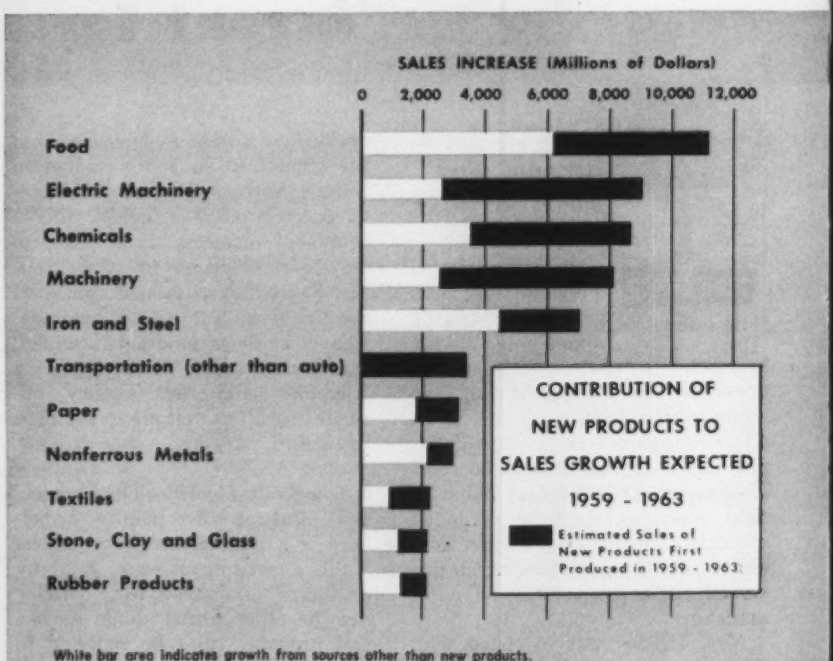
• **It Takes Guts**—Profits grow from the seed of courage. The firm that pushes, rather than curtails, its research effort during times of poor profits will reap the big profit growth when the boom arrives.

Listen to E. H. Land, scholarly founder of Polaroid Corp.: "During prosperity, the challenge is simply to make worthwhile products and keep yourself busy. But during recessions, the challenge is to create new fields to make work for people who need it."

Or look at Radio Corp. of America. Of every $5 in 1960 sales, $4 came from products researched and developed after World War II. The firm's chairman, Brig. Gen. David Sarnoff, asserts that "the products of research will double RCA's sales volume before the sixties end."

But even with such demonstrated payoffs, management is reluctant to commit the dollars and people necessary for metalworking to innovate itself back to prosperity.

Their fear has a firm foundation. A study of 922 new products by Booz, Allen & Hamilton revealed that only 49 per cent were successful. The consultants found that 79 per cent of development, testing,



and commercialization costs were wasted on unsuccessful products. Lippincott & Margulies, New York industrial design consultant, reports that 23 out of 26 new products fail.

On that basis, the U. S. wastes far more than half of its $13 billion annual R&D budget.

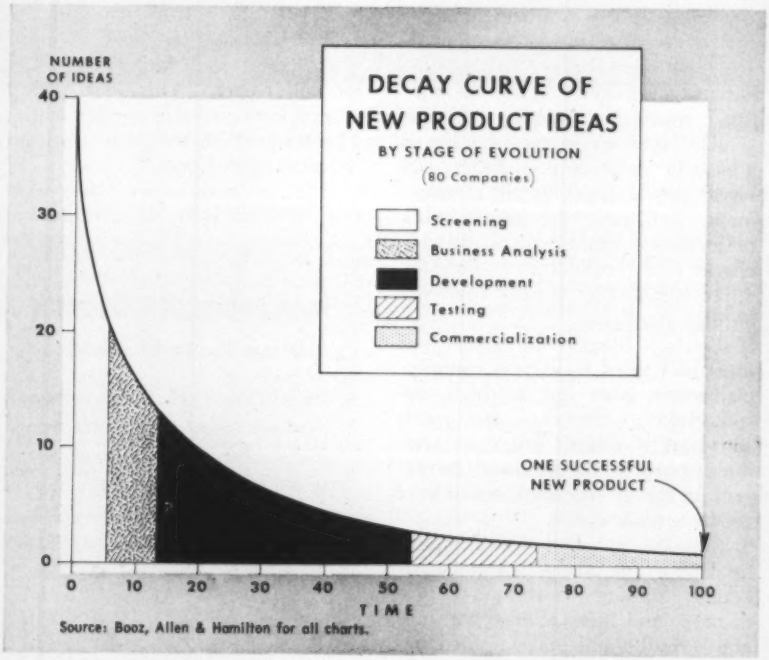
• **Why Failures?**—This table, prepared by Booz, Allen & Hamilton shows that the new product failure rate varies little among industries —but that "there is a great difference in failure rates among companies within an industry."

	Product Ideas	Development Projects	New Products
	Success Percentages		
All Industry Groups	2.4%	12.5%	49.0%
Chemical	2%	10%	47%
Consumer Packaged Goods	1%	6%	40%
Electrical Machinery	3%	17%	57%
Metal Fabricators	2%	14%	38%
Nonelectrical Machinery .	2%	20%	52%
Raw Material Processors.	4%	13%	60%

The consulting firm points out that between major companies in the same industry efficiency ranges from less than 1 per cent to more than 50 per cent. ("Efficiency" here means the percentage of the company's new product expenses devoted to successful products.) The firm traces the variance to "differences in management effectiveness." Let's look at some of the approaches used by successful innovators.

• **Polaroid**—New products at Polaroid Corp. don't result from extensive formal market research. "Industry must have an insight into what are the deep needs of people that they don't know they have," says Mr. Land. He says the man who makes discoveries has "freed himself from a way of thinking that is held by friends and associates who may be more intelligent, better educated, better disciplined, but who have not mastered the art of the fresh, clean look at the old, old knowledge." Mr. Land's aim is the "ideal company" where "the working life is so deeply satisfying, so richly rewarding that leisure becomes relaxation rather than escape."

• **Westinghouse** — Westinghouse Electric Corp. has established "think companies." In a research lab near Pittsburgh, one group of scientists concentrates on seeking basic knowledge, such as that pertaining to production of light by solids or the origin of magnetism. At Baltimore, other scientists apply basic knowledge to national defense problems. And at Cheswick, Pa., another group tackles the problem of what products will be needed in the home 10 or 15 years from now.



Source: Booz, Allen & Hamilton for all charts.

• **AMC** — American Motors Corp. believes in an "evolutionary" approach to new products. Says B. A. Chapman, executive vice president: "We advance into new products and new techniques not in seven league boots but in dancing slippers that take us in small, measured steps into previously unknown or uncharted areas of development." He points out that the genuine breakthrough is rare and that the manufacturer's hope for tomorrow lies in "the evolutionary improvement of today's products."

• **Texas Instruments** — Texas Instruments Inc.'s "total technical effort" expenditure equals about 15 per cent of annual sales volume. President Patrick Haggerty affirms his belief in basic research but also insists that "we must learn to orient our technical work to produce better products much more rapidly."

• **How to Do Better**—Booz, Allen & Hamilton divides the new product development process into six phases and offers suggestions for improving the effectiveness of each:

1. *Exploration*—First, you must determine the product fields of primary interest to your firm—by analyzing major company problems, evaluating your principal resources, identifying external growth opportunities that are ready for exploitation.

Next, you should establish a program for planned idea generation. That involves identifying idea generating groups and individuals, giving them a clear concept of the company's interest fields, exposing them to facts that spark ideas, minimizing distractions, and arranging for exploratory technical research.

Third, you must collect the ideas through an organized network. That involves covering selected outside idea sources and setting up an internal collection point. Then you must actively and directly solicit the ideas, consider each first on a "can do" basis, and treat the idea man with tender, loving care.

2. *Screening*—The first step in this phase is to expand each idea into a full product concept and prepare a written proposal.

Next, you collect facts and opinions bearing on the product idea as a business proposition. That involves selecting evaluation tech-

JUDSON S. SAYRE (LEFT), CHAIRMAN, NORGE DIV., BORG-WARNER CORP., takes ice cubes from his firm's commercial thermoelectric refrigerator to fill the glass of V. C. Rice, Norge's vice president-manufacturing and engineering

'Jesus Was 8 1/2 Per Cent Wrong'

"When the Lord picked His 12 apostles, He made one error. He was 8½ per cent wrong. We certainly can't expect to do better than the Lord."

The point of that story, when told by Norge's Judson Sayre, is this: An executive must be willing to make decisions, to commit dollars, to select and assign people, even though he is not 100 per cent sure that he's right.

Mr. Sayre points out that management plays a "scared game." It's tough to commit dollars to an untried idea when your profits are low. It's hard to sell a new concept to the president at a time when every green etching of George Washington that comes into the profit till seems as precious as a masterwork of art.

But, says Mr. Sayre, that is exactly the time when innovation is essential. Successful research efforts aren't run through a valve. They can't be turned off and on and off again. "The search for consumer benefits must be constant," Mr. Sayre asserts.

How do you innovate? One successful approach is to seek out the major problem and solve it. That's how Norge came up with its new automatic washer that can be completely serviced from the front. The firm found that the major concern of homemakers about their automatic washers was the high cost of service. So Norge designed a washer and an electronic service analyzer that the firm says will "eliminate the cause of 1 in 3 service calls and cut service time by 33 per cent when a call is required." The invention came as the solution to the industry's major problem.

Says Mr. Sayre: "Too damn many top people in business are trying to solve the wrong problems. They can't seem to differentiate between essentials and nonessentials. They constantly emphasize the wrong thing. That's why we have so much indiscriminate price cutting. That's why we have the profit squeeze. That's why we haven't come up with enough new products that really excite the customer."

Mr. Sayre also has highly noncomplimentary words for the top executives who fail to concentrate on real customer benefits in their product development programs. Example: The firm that accentuates surface styling rather than product performance. Says Mr. Sayre: "There is nothing more frightening than ignorance in action."

niques to fit the idea, identifying fact sources, inexpensively gathering the facts, and applying strictly the principle of diminishing returns to the fact gathering.

Then each idea must be appraised for its potential value. You estimate the profit potential, assess the investment, time, and risk requirements, and provide for later review of any ideas that are discarded.

3. *Business Analysis*—Here you appoint the people responsible for further study of each idea. Booz, Allen & Hamilton recommends a small team, representing the departments that would be affected, with persons selected on the basis of self-interest.

Then you determine the desirable market features for the product. That involves learning the characteristics and trend of the market, analyzing competitors and their products (existing and potential), and identifying characteristics that would differentiate the product.

Next, you develop product specifications and establish a definite program. You evaluate alternative ways to spend the time and money, establish a timetable, reduce the proposed idea to time, costs, manpower, profits, and benefits, and get top management approval for a development program.

4. *Development*—At this point, you: 1. Explode the product proposal into projects, schedule the projects, and establish yardsticks for measuring performance and progress. 2. Exhaust available data on the subject, maintain security against "leaks," conduct market studies as a basis for enhancing salability, and report any changes to top management. 3. Conduct lab tests to check performance against specs, provide checks to assure objective appraisal, apply commercial (rather than scientific) standards.

5. *Testing*—Identify the factors that must be proved to support commercialization; plan test methods, responsibility, schedule, and cost; construct a testing program; conduct in-use, production, and market testing; survey reactions; make final product design.

6. *Commercialization* — Complete final plans for production and marketing; initiate co-ordinated production and marketing programs; check results and make needed improvements in product, manufacturing, and marketing.

• Challenge—Booz, Allen & Hamilton hurls the challenge: "Well managed companies concentrate on determining what should be developed. It takes just as long and just as much money to develop a $1 million bust as a $10 million dollar bell ringer. There are plenty of problems to solve in the world. The secret of success is to work on the most useful ones."

PLAN FOR PROFIT GROWTH

Design for Profit Growth

On July 31, STEEL will show how improved design can increase your profits. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Problem: Lack of pep -- and people -- due to bad air

This plant needs make-up air! If production is off because your workers lack pep or become sick from bad air, check your exhaust system! Its fans may be removing air faster than you replace it. This causes a vacuum that can put your plant ventilation dangerously out of balance. Your plant needs make-up air...a supply of new air to replace exhausted air.

Without make-up air, the vacuum can cause down drafts in combustion flues and exhaust hoods, exposing workers to carbon monoxide and other dangerous fumes. Vitality sags. Absenteeism rises. Production drops.

Solution: install a make-up air system -- fans to bring in fresh outside air, and heaters to temper it. You cancel out the vacuum, ease the load on exhaust fans and the regular heating system. No ventilation plan is complete without make-up air.

For technical help on make-up air, see your Consulting Engineer. Or call in Sturtevant application engineers. They're experts in handling air...whether you want to move it, heat, cool or clean it. J-80710

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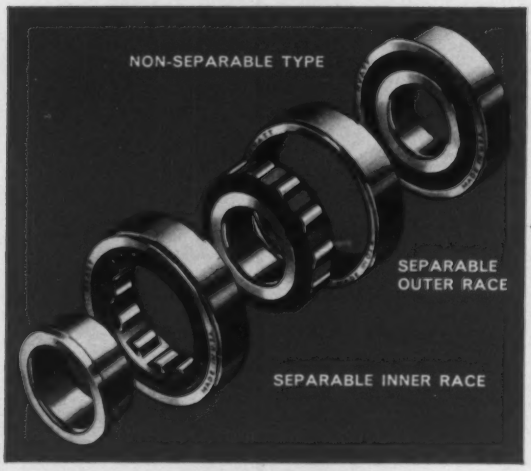

RELIABILITY

Hyatt reliability is measured by results. For example, The Hyatt Reliability Program embraces every phase of product development. In procurement, it weeds out all but the highest-grade raw material. In engineering, Hyatt Reliability insures efficient, accurate design. In manufacturing; it provides careful inspection and rigid adherence to specifications. And Hyatt Reliability does not stop there. Hyatt sales engineers work with you to help recommend the best possible bearing for your requirements. Then, they follow up to make sure Hyatt bearings deliver in service. And no one knows more about cylindrical bearings. For over 68 years, Hyatt has produced top-quality bearings for almost every type of application. Check the benefits that are yours when your "specs" read Hyatt.

2

PRICE. Hyatt's advantages of quality, assembly practice and uniformity of product can often reduce over-all cost to you.

3

DELIVERY. Hyatt's unsurpassed production facilities deliver bearings in quantity with maximum speed and economy.

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ENGINEERING. Hyatt's engineering is backed by the extensive research and engineering facilities of General Motors.

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SERVICE. Hyatt Sales Engineers are trained bearings specialists who can save you man-hours and dollars.

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FOR MODERN INDUSTRY

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.

What challenges does the auto industry face in the decade of the sixties? For the answers, STEEL went to the industry's top executives. Company presidents give their views in this article. Coming up: Comments by managers in marketing, manufacturing, and materials.

Autodom's Challenges in the '60s

John F. Gordon, President
General Motors Corp.

THE MOST PRESSING problem facing our industry in the 1960s is to keep ourselves young, vigorous, and dynamic. A business can age, just as people do. Its thought processes can slow down; its imagination can become dull; it can become timid and less responsive to new ideas that are generated.

Those things must not happen to the automobile industry. The industry is no longer young in years, but it must continue young and vigorous in spirit.

And the best way to do so is to keep infusing young, new blood into its veins. It must continue to attract promising young men in engineering, in design, in accounting, in business administration—in all fields its operations encompass. It must continue to enable young men and women to assume responsibilities as they prove themselves capable.

Only in so doing can the automobile industry continue to play a vigorous role in a dynamic economy.

Only in this way can it make its maximum contribution to the strength of America and to the continued growth and progress of the national economy.

John Dykstra, President
Ford Motor Co.

THE MOST CHALLENGING problem the automobile industry will face in this decade is to anticipate changes in customer preferences and to stay flexible enough to be able to provide the kinds of products customers want when they want them.

The automobile industry in the future will have to look in new directions, pioneer new products, develop new ideas. Only an alert, efficient management will be able to meet (such a) challenge.

To be successful, automotive managers will have to sharpen their marketing research tools to obtain a better and quicker fix on significant shifts in consumer preferences. They will have to learn to distinguish quickly between fads and solid, long term demand.

Their single, most important challenge will be to give customers solid value and top quality products for the money. From the design, engineering, and manufacturing standpoints, the watchword must be flexibility. We must learn to shorten leadtimes from drawing board to final assembly and keep ourselves in position to step up quickly to new demands.

(*Please turn to Page* 88)

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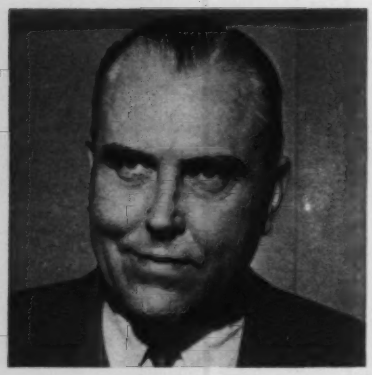


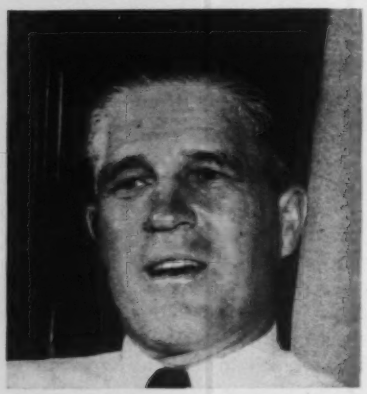
L. L. Colbert, President
Chrysler Corp.

AUTOMOBILE MEN like to look ahead . . . to the size and nature of future markets. We feel confident those markets will continue to grow at a satisfactory rate.

There is general agreement that the number of cars in use in 1970 will be in the neighborhood of 80 million. The difficulty lies in predicting what kinds of cars will make up those 80 million. What percentage of cars sold in 1970 will be (in the) compact class or smaller? Will the present piston engine be replaced by entirely new types of powerplants, such as gas turbines, solar batteries, or fuel cells? What percentage of families will own two cars or more?

Those are some of the challenging questions that confront us in the decade of the '60s. The answers will have to come out of the interplay of competition, customer needs and preferences, and the creative fires of the engineering imagination.

From one end of the industry to the other, there is an open minded willingness to examine new and unorthodox approaches. Old and deep rooted dogmas are being questioned. New and successful bids are being made for the customers' favor.



George Romney, President
American Motors Corp.

PRODUCT VALUE is and will continue to be one of the most challenging aspects of automotive manufacturing. The compact car revolution has demonstrated an irrefutable fact: The U. S. car buyer has developed a new set of values which govern his selection of personal transportation.

To a large degree, the car buyer now thinks in terms of function and usefulness. He is primarily concerned with better economy, lower operating and maintenance costs, and features of construction which assure longer car life and maximum retention of resale value.

As a result, the industry is placing greater emphasis on basic product improvement. The competitive battle has turned from excessive preoccupation with styling gimmicks to product advances offering genuine benefits to the buyer.

Product value requires good quality control and this will become increasingly important.

Cost factors are fundamental to product value, which means the automotive supplier and manufacturer must seek and utilize the most advanced technological tools available for each step of the production process.

Sherwood H. Egbert, President
Studebaker-Packard Corp.

IN MY OPINION, the most challenging problem . . . is meeting the competition in a rapidly developing world-wide market. With our great and growing capacity to produce we increasingly require a world market for sale of our products. The economies of countries outside North America are progressing at an astonishing rate. This will ultimately result in an export market three or four times the size of the North American market.

We can be certain that our competitors in other countries will be entering these markets. We also will face the competition of Communist nations with all the resources of their socialized economies. Our competition will be an important factor in the struggle for world domination between free enterprise and Communism.

How can the auto industry meet this challenge? I believe that free enterprise will be successful—if it is granted freedom from restrictions that now act to impede expansion —and if it follows basic principles.

Depreciation allowances on plant and equipment should be brought into line with those of our European competitors. Every effort should be made to provide corporate tax relief, especially in view of rising material and labor costs.

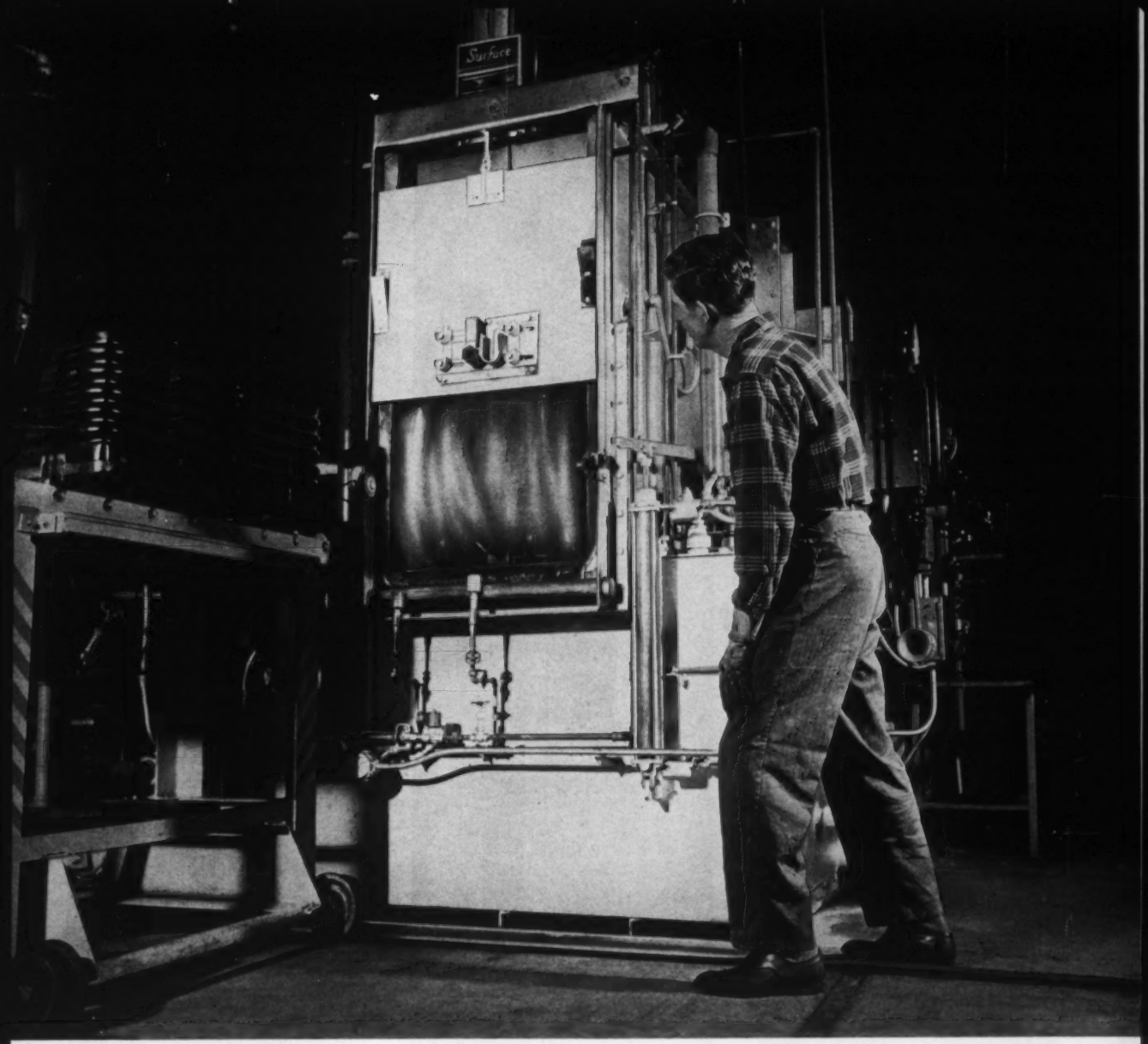
U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	559,474	613,136
6 Mo. Totals	2,736,719	3,809,494
July		434,377
August		305,514
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108

Week Ended	1961	1960
June 10	127,256	139,423
June 17	129,274	137,641
June 24	128,216	141,247
July 1	125,297	125,868
July 8	86,281†	89,769
July 15	110,000*	105,113

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.



Fifty different job lots are heat treated in 24 hours in this one Allcase® furnace.

The Ohio Metallurgical Service of Elyria, Ohio, is finding the Surface Allcase Furnace the solution to maintaining high quality, competitive prices, and fast delivery. A large variety of small job lots, such as small machine components, forgings, and automotive parts, are treated in a carbon controlled atmosphere, which adjusts automatically.

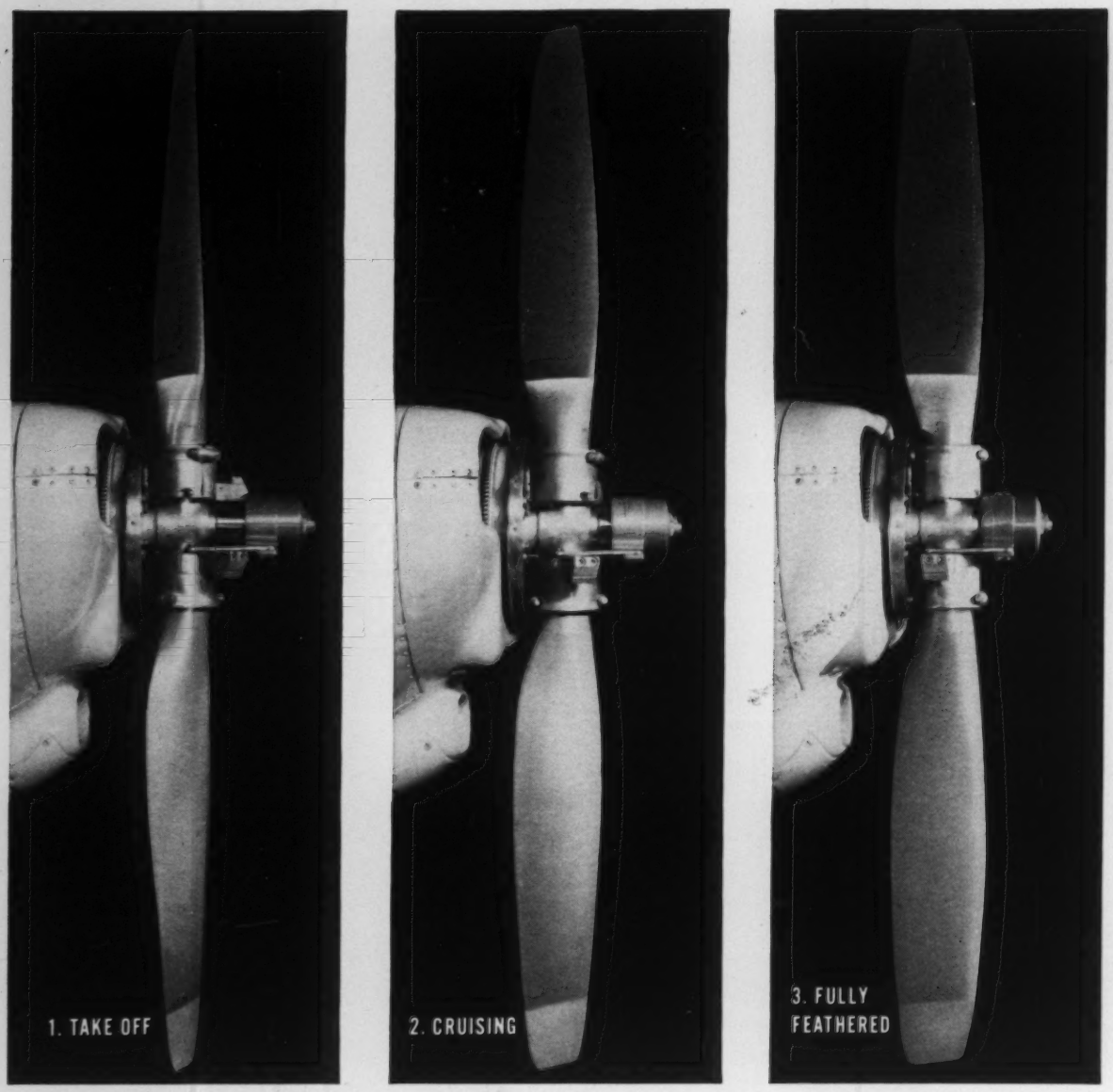
Critical temperature control has eliminated warpage of even the smallest springs. Unique Surface Power Convection permits uniform heating of high density loads and uniform atmosphere contact for all parts, eliminating rejections. Gas consumption has been reduced 30 percent.

Write for information: 2385 Dorr St., Toledo 1, Ohio. In Canada: 2490 Bloor St., West, Toronto.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

Small planes get the airline pitch



from Hartzell and Timken® steel

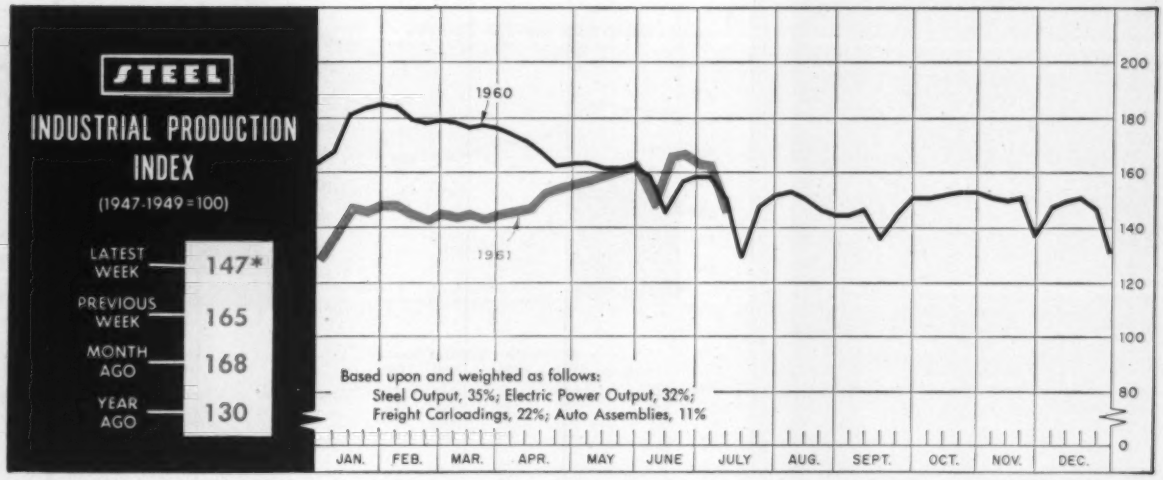
To help make executive and private aircraft as "all-weather" as the airlines, Hartzell Propeller Company designed a constant-speed propeller with full feathering and reversible pitch. Short field landings are no problem. Executives can land at a more convenient airport in many cities.

The resemblance to the big transports doesn't stop there. To get the right aircraft quality steel for the propeller hubs, Hartzell engineers came to the Timken Company. Timken® fine alloy seamless steel tubing is known for its cleanliness. And the metallurgists who make it are known for coming up with the best solution to tubing problems. Timken 4140 steel tubing of aircraft quality is cleaner. The propeller hubs can be made light yet strong. And Timken steel tubing cuts rejections because of its uniform response to heat treating. Every part is up to specification. Due to this consistent performance, Hartzell now specifies Timken quality steel for their forgings.

Timken Company metallurgists have been finding solutions to tough steel problems for over forty years. They're specialists in specifying the right mechanical tubing to keep costs *and* rejects down. If you have a steel problem, why not call on the Timken Company? Our experts will be glad to work with your engineers and designers. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

TIMKEN®
FINE ALLOY
STEEL

TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES



*Week ended July 8.

Capital Spending Record in '62?

LOOK for capital spending to hit a record $38 billion in 1962 vs. $34.5 billion this year and the all-time high of $37 billion in 1957. The trend will continue into 1963.

That's the projection of James M. Dawson, vice president and economist, National City Bank of Cleveland.

As usual, capital spending is lagging the revival in the over-all economy. The latest decline has proved moderate, and a third quarter rise in expenditures is consistent with the timing in two of the three postwar recoveries. (Metalworking executives say they plan to order more capital equipment in the second half than they did in the first—see STEEL, July 3, p. 23.)

Such a comparison, points out Mr. Dawson, implies a fourth quarter, 1962, spending rate that will be about 15 per cent ahead of the current pace.

• **Cash Flow Encouraging** — Over the years, notes Mr. Dawson, cash flow (retained earnings, plus depreciation) has been an important determinant of capital spending. The combination of business recovery and the steady rise in depreciation should add substantially to the cash flow in 1962, yielding an amount higher than projected capital expenditures.

"In each of the three previous cycles," observes Mr. Dawson, "capital spending has trailed cash flow in the first year out of the recession. But it has moved up to exceed it in the following year. A repetition of this pattern would mean a further rise in capital spending in 1963."

Assuming a continuation of the historical pattern, it appears we will experience two years of expanding capital outlays.

• **Too Much Capacity?**—Does excess capacity negate those projections?

Such excess is not new, points out Mr. Dawson. "By yearend, manufacturers will probably be operating

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,850[1]	1,779	1,476
Electric Power Distributed (million kw-hr)	14,200[1]	15,183	13,408
Bituminous Coal Output (1000 tons)	1,865[1]	8,970	1,836
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,888	6,831
Construction Volume (*ENR*—millions)	$379.2	$456.7	$518.7
Auto, Truck Output—U. S., Canada (*Ward's*)	112,025[1]	162,029	111,656
TRADE			
Freight Carloadings (1000 cars)	430[1]	534	456
Intercity Truck Tonnage (changes from year ago)	+1.7%	+1.2%	+1.3%
Business Failures (Dun & Bradstreet)	326	307	278
Currency in Circulation (millions)[2]	$32,480	$32,202	$32,155
Dept. Store Sales (changes from year ago)[2]	−1%	+2%	+16%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,889	$29,406	$24,001
Federal Gross Debt (billions)	$289.0	$290.1	$286.3
Bond Volume, NYSE (millions)	$26.8	$25.4	$20.3
Stocks Sales, NYSE (thousands of shares)	11,965	13,544	11,816
Loans & Investments (billions, adjusted)[3]	$113.1	$114.2	$103.4
U. S. Govt. Obligations Held (billions)[3]	$32.0	$32.9	$25.4
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.0	225.5	232.2
All Commodities[6]	118.7[1]	118.7	119.5
Commodities Other than Farm & Foods[6]	127.7[1]	127.7	128.4

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

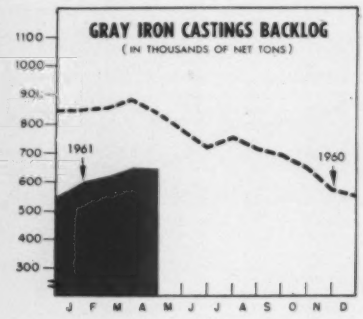
ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

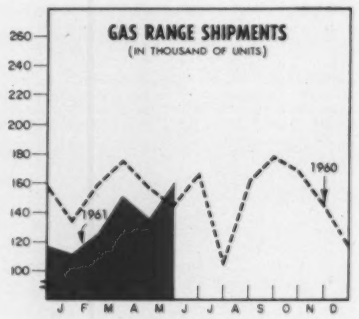
ESTABLISHED 1866

THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

THE BUSINESS TREND





	Shipments 1961	Shipments 1960	Unfilled Orders* 1961	Unfilled Orders* 1960
Jan.	760	1,136	600	851
Feb.	702	1,108	621	855
Mar.	856	1,143	652	880
Apr.	869	1,051	645	834
May	....	1,053	...	782
June	....	1,050	...	720
July	....	803	...	755
Aug.	....	859	...	713
Sept.	....	900	...	695
Oct.	....	905	...	647
Nov.	....	836	...	569
Dec.	....	749	...	553
Total	....	11,593		

*For sale. U. S. Bureau of the Census.
Charts copyright, 1961, STEEL.

	Shipments—Units 1961	1960	1959
Jan.	114,800	133,400	148,700
Feb.	124,800	159,300	152,400
Mar.	150,800	174,800	171,300
Apr.	136,300*	156,500	165,800
May	160,100*	145,500	160,400
June	.....	166,500	171,000
July	.....	105,700	143,800
Aug.	.....	162,800	176,400
Sept.	.....	178,600	210,500
Oct.	.....	169,000	195,000
Nov.	.....	144,400	159,900
Dec.	.....	117,900	157,100
Totals	.....	1,814,300	2,012,300

*Preliminary.
Gas Appliance Mfrs. Assn.

at about 82 per cent of capacity," he predicts. The average yearend figure for the years 1954-60 was 83 per cent. And at the start of the recovery years of 1955 and 1959, the ratios were 84 per cent and 80 per cent.

Concludes the banker: "Capacity that is outmoded, inefficient, and noncompetitive is capacity that should be replaced."

Profits Improving

While many manufacturers are waiting to see what Congress is going to do about depreciation reform before committing funds for capital expansion, the profit squeeze is holding up a good number of programs.

Average manufacturing profit margins are being squeezed more than in any previous postwar recovery, relates Prentice-Hall Inc., Englewood Cliffs, N. J. However, profits are slowly rising from their first quarter cyclical low point, reports P-H. Both factory deliveries and new orders swelled 2 per cent in May, with new orders substantially ahead of the year ago pace for the first time in nine months.

• **Prices Weak**—Many prices are still on the soft side. Price shading is prominent in retail markets. And outright price cuts have been made in a number of industrial lines.

But Prentice-Hall suggests that the weaknesses are partly seasonal, and except where foreign competition is tough, as in wire, nails, and reinforcing bars, rivalry on the basis of price is usually temporary because it is self-defeating (see STEEL's impact issue, "Let's Stop Price Fighting," Apr. 17).

Jobless Areas Decline

Nine major labor markets have been removed from the national list of "areas of substantial unemployment" by the Labor Department. They are: Chicago; Wilmington, Del.; Grand Rapids, Kalamazoo, and Lansing, Mich.; Cincinnati and Dayton, Ohio; and Kenosha and Racine, Wis.

The new list includes 88 major areas of "substantial unemployment," a decline from the May total of 96 (Reading, Pa. has been added). This compares with an all-time high of 101 in March and April. However, the number of localities classified as "smaller areas of substantial unemployment" increased to 225 compared with 215 in May this year and 113 in May, 1960.

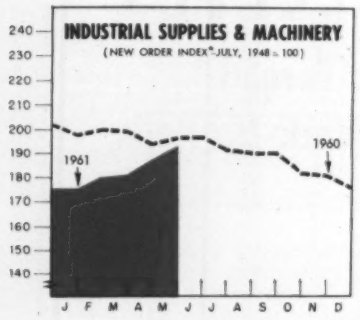
You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

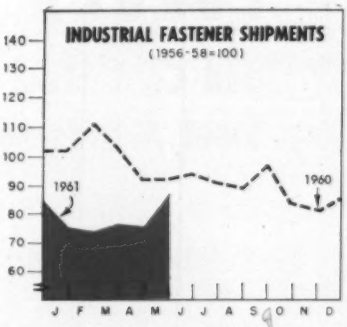
Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!* Fight cancer with a checkup—and a check to the **American Cancer Society.**



	1961	1960	1959	1958
Jan.	176	198	186	163
Feb.	181	200	202	157
Mar.	182	199	221	149
Apr.	188	194	218	148
May	194	196	218	152
June	...	197	212	164
July	...	191	216	170
Aug.	...	190	212	172
Sept.	...	190	207	178
Oct.	...	182	204	187
Nov.	...	181	202	189
Dec.	...	176	202	190

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.



(Seasonally adjusted)

	1961	1960	1959	1958*
Jan.	75	102	99	133
Feb.	74	111	105	117
Mar.	76	103	105	103
Apr.	75	92	119	102
May	86	92	119	111
June	...	94	129	120
July	...	91	112	133
Aug.	...	89	77	120
Sept.	...	97	92	141
Oct.	...	83	83	137
Nov.	...	81	80	134
Dec.	...	85	102	152
Avg	...	94	101	125

*1947-49 = 100.
Industrial Fasteners Institute.

Carloadings to Turn Up

Freight car requirements in the third quarter will increase 2 per cent over the comparable period of 1960, predict the Regional Shippers Advisory Boards. In the 32 principal commodity groups, all metalworking classifications except ore and concentrates are expected to rise above the year ago pace:

Iron and Steel	Up 17.1%
Vehicle Parts	Up 11.4%
Agricultural Implements	Up 8.6%
Autos and Trucks	Up 6.1%
Other Metals	Up 1.3%
Machinery and Boilers	Up 0.9%
Ore and Concentrates	Down 8.6%

U. S. Gold Outflow Stops

In the last four months, the outflow of gold from the U. S. has come to a halt. Between February, 1958, and February, 1961, foreigners purchased $5.4 billion gold from the U. S. Treasury, paying with dollars acquired as a result of our balance-of-payments deficit. By contrast, the U. S. gold stock increased by $153 million between February and June 21 of this year. And foreign holdings of dollars have ceased to accumulate.

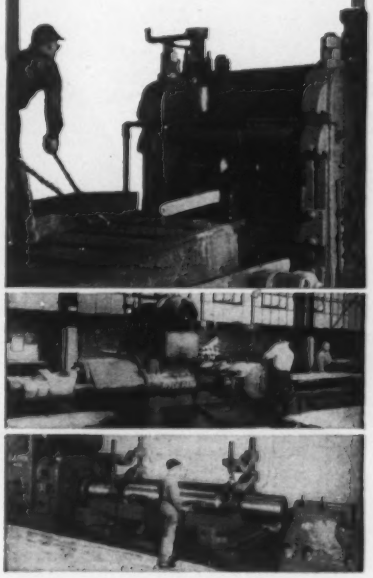
The improvement in the U. S. balance-of-payments has been greatly aided by our export trade surplus. In the first four months of 1961, the surplus widened to a seasonally adjusted rate of $6.8 billion. That compares with $4.7 billion in 1960 and only $0.9 billion in 1959.

Trends Fore and Aft

An almost endless succession of additions to the federal budget for fiscal 1962 suggests that the final spending level may be close to $90 billion, $10 billion greater than the original Eisenhower budget of last January. It will almost certainly result in a deficit substantially greater than the latest official estimate of $3.7 billion, comments the First National Bank of Boston. Adds the bank: "With outlays rising well after recovery has set in, the lack of flexibility and great difficulties in using fiscal policy wisely as a countercyclical weapon are again evident."

The Department of Commerce reports the number of business firms in operation rose by 10,000 (seasonally adjusted) in the first quarter compared with 5000 in the fourth quarter of 1960. At the beginning of this year, 4,740,000 business firms were in operation. Only 7 per cent were engaged in manufacturing.

Hyde Park
ROLLING MILL EQUIPMENT



Hyde Park Engineers are always ready to co-operate with you in selecting and applying the rolling mill equipment best suited to your operation.

Bar Mills • Merchant Mills
Sheet and Strip Mills
Stretcher Levellers
Roller Tables • Pinion Stands
Sheet Mill Shears
Roll Lathes • Reduction Drives
Special Machinery • Machine Work

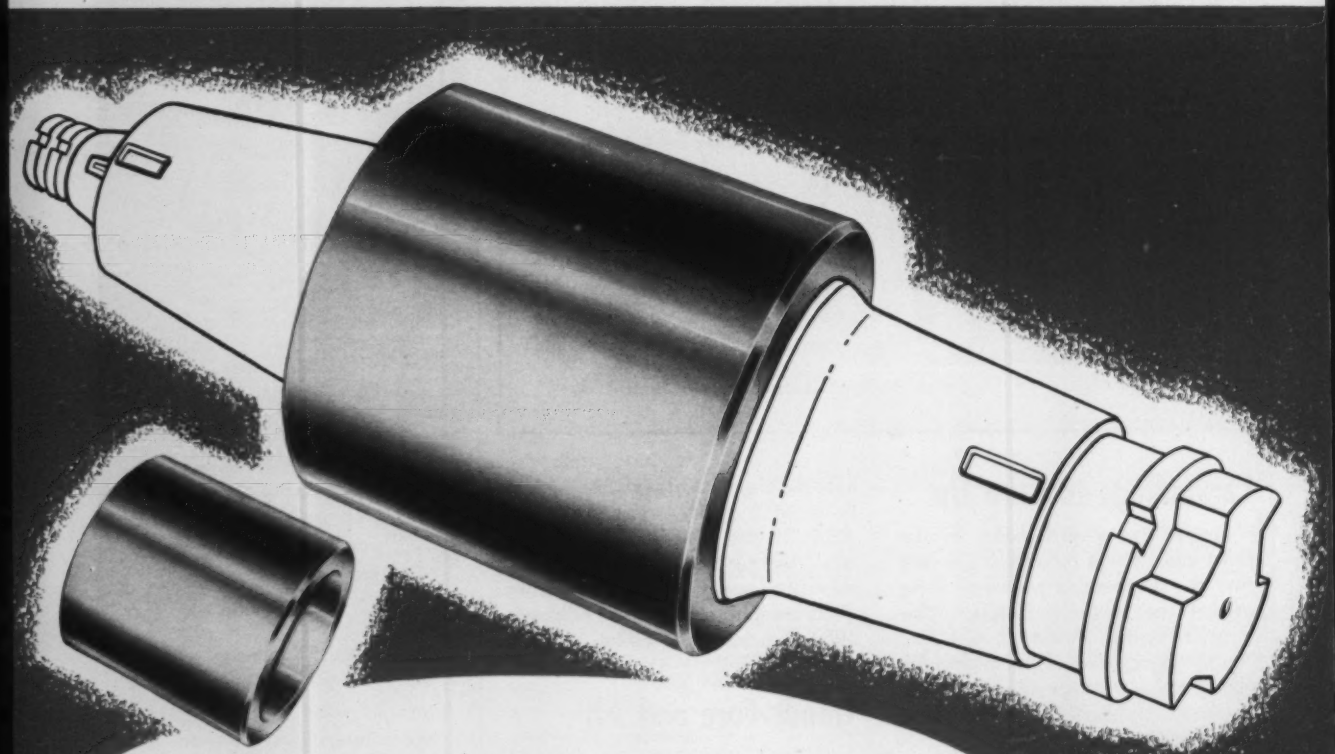
Hyde Park
FOUNDRY AND MACHINE CO.
HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings

Ohio

FORGED SLEEVES

and Cast Steel or Forged Steel Arbors for Back-Up Rolls



A Complete Back-Up Roll Service

Ohio Steel—specialists in manufacturing all types of iron, steel and forged steel rolls—now offers the rolling mill industry *a superior forged steel sleeve for back-up rolls.*

Ohio back-up roll body sleeves are forged and hardened from *balanced alloy vacuum poured degassed steel.* These sleeves are accurately machined and applied to either new or used forged steel or cast steel arbors.

Yes, Ohio Steel offers a complete back-up roll service. Ask your Ohio roll sales engineer about this modern facility that can help increase rolling mill efficiency.

THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO

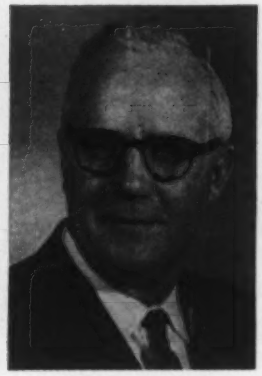
OHIO IRON and STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

PLANTS AT LIMA AND SPRINGFIELD, OHIO. *.Virtually at the center of the Steel Industry*

OR-45

W. PAUL SMITH Jr.
Driver-Harris v. p.



SID W. FARLEY
Sparton electronics mgr.

R. R. WRIGHT
Cleco Air Tools v. p.

GLENFORD M. SHIBLEY
Osborn-brush sales

W. Paul Smith Jr. was elected vice president-sales, **Driver-Harris Co.**, Harrison, N. J. He was sales manager.

Sparton Electronics Div., Jackson, Mich., Sparton Corp., appointed **Sid W. Farley** manufacturing manager. For the last two years, he served as manufacturing manager at Nortronics Div., Northrop Corp.

Hill-Chase & Co. Inc., Philadelphia, elected **Edward J. Howe** vice president-sales, **Donald MacCallum** assistant vice president; **James J. H. Hill** sales manager.

Richard V. Freeman was made assistant manager of machine tool sales, **Taft-Peirce Mfg. Co.**, Woonsocket, R. I. He is in charge of sales of the company's full line of machine tools and accessories.

A. W. Ostberg was made manager of warehouse distribution, **Link-Belt Co.**, Chicago.

R. R. Wright was made vice president, **Cleco Air Tools Div.**, Houston, Reed Roller Bit Co. He is succeeded as chief engineer by **Martin Hoza.**

Eugene R. Crandall was made manager-Mullite operations, Shelton, Conn., Works, for the Refractories Div., **H. K. Porter Company Inc.** Prior to joining Porter, he was with American Refractories & Crucible Corp.

Harold D. Fitch was made general manager, Fabricated Metal Goods Div., **Anaconda American Brass Co.**, Waterbury, Conn., to succeed the late **John A. Wright.**

Robert H. Davies succeeds **Paul F. Smith** (retired) as president, International Div., **Parker - Hannifin Corp.**, Cleveland. Mr. Davies, a Parker-Hannifin vice president and formerly manager, Accessories Div., is succeeded in the latter post by **W. G. Webster,** chief engineer of the division.

Glenford M. Shibley was named sales manager, Brush Div., Cleveland, **Osborn Mfg. Co.** He was manager, industrial distribution.

Palmer-Bee Co., Bloomfield Hills, Mich., appointed **Joseph P. Benz** vice president-national sales, and **David F. McFadden** assistant chief engineer.

John W. Anderson was made vice president - engineering, Electronic Data Processing Div., **Minneapolis-Honeywell Regulator Co.**, Wellesley, Mass. He succeeds **J. Ernest Smith,** named vice president of the EDP Div.

R. G. Parks was elected a vice president of **National Castings Co.** (formerly National Malleable & Steel Castings Co.), Cleveland.

Gilbert R. Shockley was named general director, Product Development Div., **Reynolds Metals Co.**, Richmond, Va. He was vice president for metals in the International

RICHARD V. FREEMAN
Taft-Peirce sales post

A. W. OSTBERG
Link-Belt warehouse mgr.

ROBERT H. DAVIES
Parker-Hannifin executive

GILBERT R. SHOCKLEY
Reynolds Metals div. post

ROBERT S. GENTZ

MICHAEL TENENBAUM

Inland Steel mfg. and research posts

WILLIAM R. McCALISTER

JOHN D. TYSON

National Tube Div. appointments

Div. of Olin Mathieson Chemical Corp.

Inland Steel Co., Chicago, appointed **Robert S. Gentz** general manager of its Indiana Harbor, Ind., Works. He reports to **F. G. Jaicks**, vice president-steel manufacturing, who has been holding the combined posts of vice president and general manager. **Michael Tenenbaum** was made general manager-research and quality control, a newly created post. **James Halley** was made manager of research and development, reporting to Mr. Tenenbaum. He succeeds **Edwin D. Martin**, retired.

At **Aerojet-General Corp.'s** Atlantic Div., Frederick, Md., **Sal LaFaso** was made manager of the Administration Dept., and **S. W. Kerkering** manager, Production Dept.

John H. Durant was named manager of a newly created Standard Products Div. of **Vacuum Specialties Inc.**, Somerville, Mass., subsidiary of Geophysics Corp. of America.

William R. McCalister was appointed director-industrial engineering for **National Tube Div.**, Pittsburgh, U. S. Steel Corp. Former general superintendent, Elwood City, Pa., Works, he is succeeded by **John D. Tyson**. **James O. Light** was named assistant to vice president-operations to succeed Mr. Tyson. **William H. Hall** was made assistant general superintendent, Ellwood Works. **Thomas W. Young** replaces Mr. Hall as assistant general superintendent, Gary, Ind., plant, and **John J. Hopper** was made assistant to general superintendent, Gary.

James P. Buckley was made director-marketing and planning, **Bendix-Pacific Div.**, North Hollywood, Calif., Bendix Corp.

Louis C. Kemo was made plant superintendent, Benwood, W. Va., Works, **Wheeling Steel Corp.**

Thomas A. Williams was appointed vice president and general manager of **Dynaco Mechanisms**, engineering subsidiary of Dynamic Gear Co., Amityville, N. Y., and Van Nuys, Calif.

Republic Steel Corp. named **Howard H. Chapin** general superintendent, Southern District, Gadsden, Ala. He was superintendent, Cleveland cold strip mill. **R. J. Garmy** was made superintendent of the new, 56 in., hot strip mill in the Warren, Ohio, plant. **Herman F. Kaiser** was named assistant manager, Central Alloy District, Canton and Massillon, Ohio.

Robert E. Schroeder, vice president in charge of the Ohio District of **Luria Bros. & Co. Inc.**, was appointed regional vice president, responsible for operations encompassing Chicago, Peoria, Ill., Detroit, Kokomo, Ind., St. Louis, Pittsburgh, Cincinnati, Portsmouth, Ohio, and Ontario, Canada. He remains in charge of the Cleveland office, and continues headquarters there.

W. H. Haile and **Kenneth Rush** were elected executive vice presi-

JOHN H. DURANT

joins Vacuum Specialties

LOUIS C. KEMO

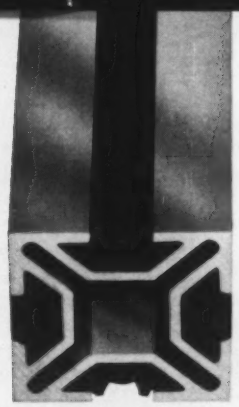
Wheeling Steel-wks. supt.

THOMAS A. WILLIAMS

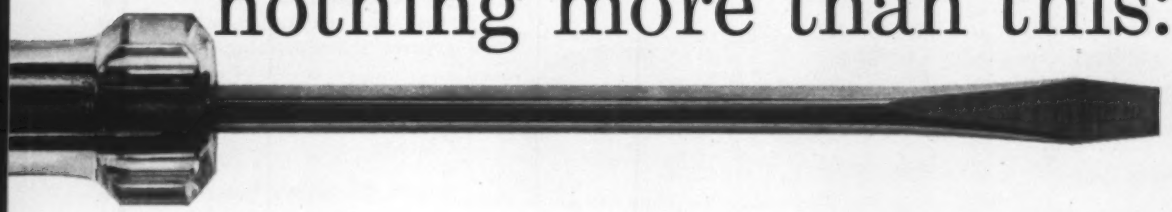
Dynaco Mechanisms v. p.

ROBERT E. SCHROEDER

Luria regional v. p.



Because of this extrusion, engineered with Olin Aluminum, 15 floors of the TIME-LIFE building in New York City can be quickly re-shaped with nothing more than this:



Olin engineers helped design this unique extrusion to serve as the universal junction of movable wall panels. The genius of this extrusion makes it possible to change office size, shape and color in jig time with nothing more than a screwdriver! So many Olin ideas like this have saved so much time and money for fabricators, designers and architects that modesty forbids telling all. As versatile as aluminum is, it doesn't think, doesn't create designs, or doesn't fabricate itself. That's why Olin Aluminum offers you the services of its marketing and technical staff. They "think aluminum." Don't you think it would be a good idea to call Olin?

Olin
ALUMINUM
400 PARK AVE., NEW YORK 22, NEW YORK

JOHN M. RICHARDSON
A. O. Smith marketing

WILLIAM S. POWELL
Hexcel Products pres.

WILLIAM G. BENZ
Combustion Eng. post

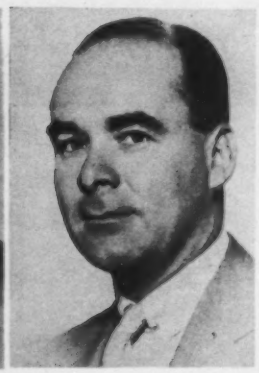
THEODORE S. HOFFMAN
Hoffman Electronics v. p.

CARLTON C. DAVIS Jr.
Elliott compressor sales

WILLIAM T. BERTIER
Revere Copper v. p.

DONALD W. DAVIS
Stanley div. gen. mgr.

ROBERT T. EAKIN
Koppers v. p.



JOHN P. FINN
H-W-D sales v. p.

dents of **Union Carbide Corp.**, New York.

Donald W. Davis was made general manager, **Stanley Steel Strapping Div.**, Stanley Works, New Britain, Conn. He succeeds **Harrison C. Bristoll**, vice president of the Stanley Works and general manager of the division, who retired.

Robert T. Eakin was made vice president of **Koppers Co. Inc.'s** Engineering & Construction Div., Pittsburgh. Prior to joining Koppers earlier this year, he was vice president-operations, Latrobe Steel Co.

Harrington - Wilson - Daum Corp., Mt. Vernon, N. Y., appointed **John P. Finn** vice president-sales.

John M. Richardson was named to the new post of marketing manager, Electric Motor Div., Tipp City, Ohio, **A. O. Smith Corp.** He previously served for 20 years with Canadian General Electric Co.

William S. Powell was elected president and chief executive officer, **Hexcel Products Inc.**, Berkeley, Calif. **Roger C. Steele**, president-founder of Hexcel, becomes chairman.

William G. Benz was made director of quality control, **Combustion Engineering Inc.**, New York.

Theodore S. Hoffman was named vice president and manager, Semiconductor Div., **Hoffman Electronics Corp.**, Los Angeles. Former director of operations at the Evanston facilities of the division, he succeeds **Dr. Morton B. Prince**, appointed to the new staff post of chief scientist and vice president of the division.

Carlton C. Davis Jr. was made manager, Compressor Sales Dept., **Elliott Co.**, Jeannette, Pa.

William T. Bertier was elected a vice president and general manufacturing manager of **Revere Copper & Brass Inc.**, New York. He was chief engineer and assistant general manufacturing manager.

Robert C. Mohr was named vice president-sales, **John Mohr & Sons**, Chicago.

Joseph W. Sellers was made product manager-motor graders for **LeTourneau - Westinghouse Co.**, Peoria, Ill.

Charles P. Wenner was elected chairman of **James R. Kearney Corp.**, St. Louis, and **Hubbard & Co.**, Chicago, to replace **Franklin H. Kissner**, resigned. **John R. Morrill** succeeds Mr. Wenner as president of Kearney and he continues as president of Hubbard.

Donald Burtner and **John Hill** joined **Pittsburgh Metals Purifying Co.**, Mars, Pa. Mr. Burtner, former vice president-general manager of aluminum smelting for Rock Creek Aluminum Co., was named manager, quality control. Mr. Hill, former assistant chief metallurgist at Heppenstall Co., joins the firm as sales engineer.

Another ⋈ Test System at work...

Magnatest eddy current unit, in which magnetic continuous weld pipe is tested for serious defects as it passes through sensing coils. Fully mechanized handling and automatic marking also provided by Magnaflux Corporation.

New Selective Eddy Current Test for Continuous Weld Pipe

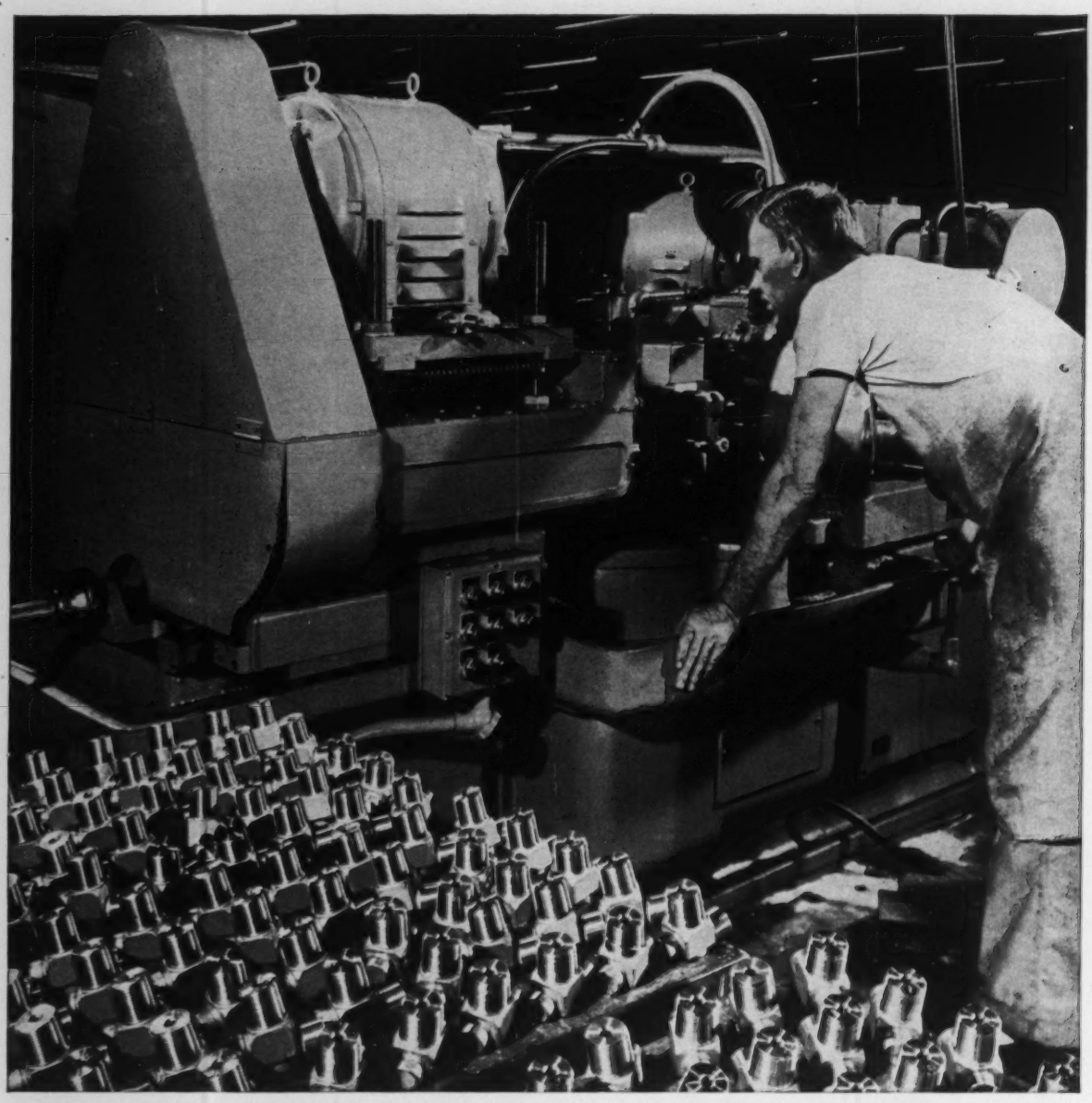
This particular Magnatest SD-100 is one of a series of new Magnaflux-developed inspection systems for testing continuous butt-weld pipe and electric weld tubing. It precisely locates and marks the defects you want to find—at speeds to 600 feet per minute or more, on diameters up to 4".

The SD-100 is selective. It can be used to find varying degrees of gross defects. It will locate ring welds, caves, dents, scabs, saw cuts, slivers, burned welds, cold worked areas. Your needs are the determining factor . . . and with automatic marking and mechanized handling, available from Magnaflux, the per shift testing rates are determined mainly by your particular requirements.

Whether you test continuous butt-weld pipe or almost any other magnetic pipe, rod or wire, find out how one of the many ⋈ Test Systems can help you standardize quality and cut costs—per foot, per day or per 100 miles! Phone our local Magnaflux Field Engineer, or write Magnaflux Corporation, 7312 W. Lawrence Avenue, Chicago 31, Illinois.

MAGNAFLUX CORPORATION
A SUBSIDIARY OF GENERAL MILLS
General Mills
TEST SYSTEMS

⋈ Test Systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD



TIGHT TOLERANCES DEMAND DORTAN® CUTTING OILS

DORTAN transparent cutting oils provide clear visibility; make measuring and gauging easy; help promote precision and fine surface finishes. Machine operators can flood work and tool areas with a full stream of Dortan and still see what they're doing.

Sulfur, chlorine, and other active agents enhance the excellent machining properties of Dortan cutting oils. Low pour points make handling easy at low temperatures; high flash points help prevent smoking in use. Four grades cover a wide range of machinability from easily machined ferrous and non-ferrous alloys to stainless and heat-resistant steels.

NEBULA® EP is an efficient multi-use grease for most bearings and machine tools. It resists softening which prevents its running out even under extreme heat and pressure conditions. Your Esso Representative can help protect your precision and profits. Give him a call, or write to us at 15 West 51st Street, New York 19, New York.

HUMBLE OIL & REFINING COMPANY

Metalworkers Step Up Foreign Market Activity

METALWORKING firms are strengthening their positions in world markets. This is being accomplished by various means, such as establishment of foreign offices and subsidiaries, and executing manufacturing, sales, and other working agreements.

• **Kaiser Steel** — This Oakland, Calif., firm will open its first foreign sales office at Buenos Aires, Argentina, on Aug. 1. B. E. Olsen is manager of Latin American sales and will head up the new office.

Other Kaiser affiliated companies are actively engaged in Latin American business activities. Willys Motors, through its partially owned subsidiaries (Industrias Kaiser Argentina S.A. and Willys-Overland do Brasil S.A.) is a leading automobile manufacturer in Latin America. Kaiser Engineers International Div., Henry J. Kaiser Co., is engaged in a number of multimillion dollar construction projects in Brazil and Argentina. Kaiser Aluminum & Chemical Corp. has offices in Buenos Aires, Sao Paulo, and Rio de Janeiro and operates plants in partnership with local interests in Buenos Aires and Caracas, Venezuela.

• **Cerro Corp.**—Cerro Sales Corp., a subsidiary of this New York firm, has taken over the sale of all metals produced from the corporation's mines in South America. The step was taken because of Cerro's greatly expanded activities, including the availability of production from Southern Peru Copper Corp. (in which Cerro has 22.25 per cent ownership), and development progress at the new Rio Blanco copper property in Chile.

• **Lear Inc.**—A subsidiary, Methodes et Materiaux de Construction, has been formed by the International Div., Lear Inc., New York, to construct and sell component homes in Europe. Under an existing agreement with National Homes Corp., Lafayette, Ind., Lear will initially distribute homes in Switzerland, France, Italy, and West Germany.

• **Rockwell-Standard** — An agreement has been signed by this Coraopolis, Pa., firm with Centrax Ltd., Newton Abbot, Devon, England, which provides for the manufacture and sale of Rockwell-Standard planetary axles in Great Britain. Rockwell-Standard also has active affiliate companies or subsidiaries in Argentina, Australia, Brazil, Canada, India, Mexico, and Switzerland.

• **S-P Mfg. Corp.**—This Cleveland firm has signed a licensing agreement covering the manufacture and sale of its products by Compagnie Parisienne d'Outillage a Air Comprime, Paris, France. The French firm makes air and hydraulic cylinders and valves. It sells throughout Western Europe, the Common Market countries, and British Isles.

• **Avnet Electronics** — This Westbury, N. Y., firm has joined Foundry Equipment Ltd. in the formation of Feco Inc. The English firm has developed and is producing automatic machinery for use in the Shaw process. It is expected that the machines will be available for delivery in the U. S. within the next few months. Feco Inc. will further the development of other new equipment and will promote the sale of all machines in the Western Hemishpere. Avnet holds exclusive rights in this hemisphere to the Shaw method of producing ceramic molds for precision casting.

• **Westinghouse Electric International**—This subsidiary of Westinghouse Electric Corp., Pittsburgh, and Le Materiel Electrique S-W, Paris, will supply about $8 million of electrical equipment to Union Siderurgique du Nord de la France S. A. to power a hot strip mill which Usinor is constructing in Dunkirk, France. Le Materiel Electrique is associated with Westinghouse under a license agreement.

The Usinor mill will be capable of producing 80 in. strip at a speed of 3360 fpm. It will have an annual capacity of 3 million tons.

Reed Enlarges Plant

Reed Rolled Thread Die Co., Holden, Mass., will erect a 10,000 sq ft addition to its plant. Installation of a central oil coolant and filtering system and an air purification unit will permit replacement of some obsolete equipment. Cost: About $400,000. The firm is a subsidiary of Union Twist Drill Co., Athol, Mass.

Space Metals Div. Formed

Roblin-Seaway Industries Inc., North Tonawanda, N. Y., formed a Space Metals Div. to manufacture high temperature alloy bars and rods for forging, forming, and extruding. The material will be alloys of nickel with chromium, iron, and exotic metals. The division was formed as a result of acquisition of Seaway Nickel Corp. which had been operated as a partially owned subsidiary.

Alan Wood Gets Equipment

Birdsboro Corp., Birdsboro, Pa., has delivered plate handling equipment for Alan Wood Steel Co.'s new, 110 in., rolling mill at Conshohocken, Pa. This machinery representing a $3 million contract comprises an important part of Alan Wood's current $36 million, two year, modernization and expansion program.

Liskey Aluminum Expands

Liskey Aluminum Inc., Anne Arundel County, Maryland, is erecting a 20,000 sq ft addition to its plant, increasing total area to 38,100 sq ft. The firm makes an aluminum flooring that's used as a base for the installation of data processing machines.

Sherritt Forms Division

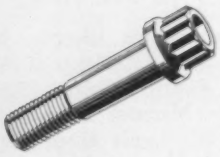
Sherritt Gordon Mines Ltd. formed a new Marketing Div. headed by Alan E. Gallie as marketing director. The division is quartered at 25 King St. W., Toronto, Ont., the head office of the company. Rex F. Pearce is manager of metal-

(*Please turn to Page* 104)

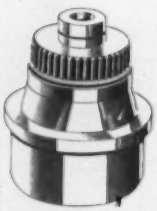
SPS research doubles

Oscilloscope registers load applied to UNBRAKO *Socket Cap Screw during fatigue test. Results prove new Hi-Life thread and pHd head design have doubled fatigue life of* UNBRAKO *Socket Screws.*

INDUSTRIAL FASTENERS like this UNBRAKO Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.



AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

"breathing" life of socket screws

A fastener is almost constantly in motion. Sometimes minutely . . . but often stretching and flexing violently under varying stress loads.

This "breathing" . . . you probably know it better as fatigue, is the killer that tires the metal in a fastener until it breaks. The period from installation to fatigue failure is fatigue life.

Two major developments in the SPS laboratory for advanced fastener research have now *doubled* fatigue life of UNBRAKO Socket Head Cap Screws.

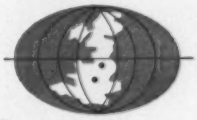
First is in the thread . . . where 85% of all screw failures occur. Research proved the flat root in an ordinary thread form invited fatigue cracks at its sharp corners. SPS eliminated this danger with the smooth, wide root radius now exclusively on UNBRAKO Hi-Life Socket Screws.

Second is in the head . . . where research has added 233% more load-carrying capacity. Proper head design (pHd) in the 1960 series incorporates a larger head for more bearing area . . . a more generous head-to-shank fillet . . . and an enlarged socket area for better wrenching and higher tightening torques.

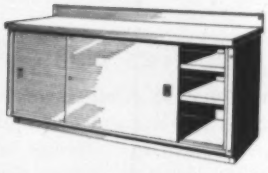
Together these advanced developments add up to the highest reliability you can get in any socket screw today. Write for literature.

SPS

where reliability replaces probability



STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Ltd., Coventry and Unbrako Steel Co., Limited, Sheffield, England • Unbrako Schrauben G.m.b.H., Dusseldorf and Koblenz, W. Germany.



SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

New Strippit Quick-Change Holder with Micro-Set Gaging System for use on any 15-A, 10-AA or 10-A Strippit Fabricator, with jig bored Micro-Bars and Dial Indicators, allows gage settings to the nearest .001" in seconds. Guess work eliminated in close tolerance gaging—spring loaded Dial Indicators provide sensitivity and "feel" in settings. No need for special gages or jo-blocks. Use quick-reading built-in scales when close tolerance gage settings are not required.

This new system, now available on all new Strippit 15-A Fabricators, also quickly adapts to all existing 15-A, 10-AA and 10-A Fabricators. Let your Strippit Tool & Methods Engineer arrange to demonstrate this new Micro-Set Gaging System to you. Or write for Catalog MS.

WALES **STRIPPIT** INC.

210 Buell Road **Akron, New York**

In Canada: Strippit Tool & Machine Company, Brampton, Ontario; In Continental Europe: Raskin, S. A., Lausanne, Switzerland; In the British Isles: Kearney & Trecker—C.V.A. Ltd., Hove, Sussex England.

(*Concluded from Page* 101)

lurgical sales; J. R. Lewis, sales metallurgist; and K. A. Young, development metallurgist. Foote Mineral Co., Philadelphia, handles the sales of Sherritt's regular metal powders to welding rod manufacturers in Canada and the U. S.

Cadre Forms Subsidiary

Cadre Industries Corp., Endicott, N. Y., formed a new subsidiary, Beta Instruments Corp., Dallas, to develop and market transistorized test instruments and amplifiers. Principal operating officers are: President and marketing director, W. D. Potter; vice president-product development, L. J. Mattingly; vice president and secretary-treasurer, C. H. Doremus. W. W. Cawley is board chairman and chief executive officer.

Steel Division Expanded

Spector Freight System Inc., Chicago, is expanding its steel division operations under the name of Steel & Special Commodities Div. James B. Godfrey Jr. will be general manager of the division, with headquarters in Detroit. District managers for steel operations will be William Shine (at Chicago) and Raymond D. Graham (at Detroit). New terminal developments are underway at Waukegan and Sterling, Ill., and Cleveland.

Press Line Broadened

Youngstown Foundry & Machine Co., Youngstown, is expanding in the field of hydraulic extrusion presses. Fred Kamena has been named chief design engineer, Hydraulic Press Div. S. T. Bowden and Joseph Mein will direct the division's sales.

Coal Properties Enlarged

Eastern Gas & Fuel Associates, Pittsburgh, will construct a multimillion dollar coal cleaning and preparation plant at its two mines at Kopperston, W. Va. The plant will process medium volatile metallurgical coal which is used in the manufacture of high grade, metallurgical coke. Another plant is being erected at Grant Town (Fairmont), W. Va., and the present fa-

New strippable plastic film for protection of stainless steel surfaces

Protects your product quality during handling and fabrication while offering these eight distinct advantages:

- 20% cheaper than adhesive paper
- Will not bleed or discolor surface finish
- Greater resistance to scratching and abrasion
- Extremely flexible—stretches well during forming, drawing and embossing
- Can be sheared, slit, blanked or nibbled without lifting film at cut edge
- Will not embrittle during storage—retains elasticity
- Reduces wear on polished dies—eliminates lubricants in some instances
- Strips off easily—leaves no residue; final cleaning unnecessary

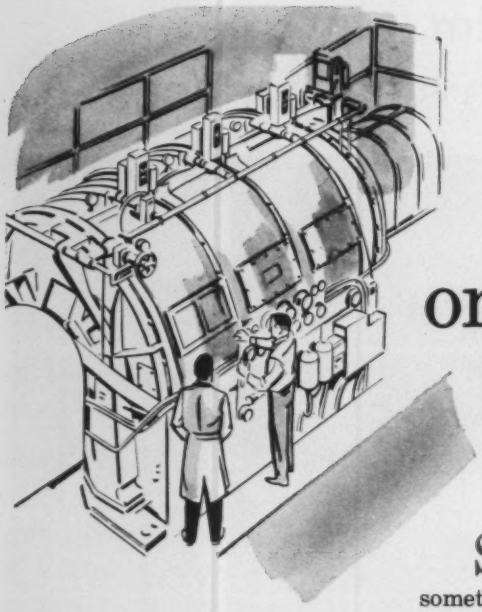
You get greater protection *plus* economy with the new in-fab plastic coating now being applied to MicroRold® stainless steel sheet, cut strip, and coiled sheet and strip. The semi-transparent protective film is 20% lower in cost than regular adhesive paper and offers more versatility in fabrication. The protective film is applied at our mill on customer order only, and is available on stainless steel in gages from .018″ to .050″ in widths up to 42″. It is guaranteed to strip off in one piece by loosening with fingernail at any corner.

Strippable plastic protection is intended as a safeguard only during ordinary handling, storage and fabrication—*not* as a barrier for weather, water damage, undue abrasion, impact or foreign substance. Once removed it will not adhere again.

Want more information or a test sample? Write to Product Development Dept., Washington Steel Corporation, 7-O Woodland Ave., Washington, Pa.

WASHINGTON STEEL CORPORATION

Woodland Avenue
Washington, Pa.



There's more than one kind of Dynamatic service!

Some folks think of "service" as the help you need when something goes wrong. That's important, of course, and Dynamatic supplies it with competent service representatives located in principal cities throughout the United States and Canada. In addition, around-the-clock seven-days-a-week service is available from the factory.

But there's another kind of service that's equally important—the service that starts even before you have purchased Dynamatic speed control equipment. It's being able to sit down with your Dynamatic representative, knowing that he has very likely been up against a problem about the same as yours before; that he has a background gained through years of experience in this specialized field.

Dynamatic service begins with your first inquiry, includes start-up supervision by factory service engineers, and follows through for the life of the equipment.

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DYNAMATIC®

Dynamatic produces Eddy-Current Drives, Couplings, Brakes, and Dynamometers. Also Dyna-torQ Magnetic-Friction Clutches, Brakes, Clutch Brakes, and Clutch Couplings.

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ORIGINATORS OF EDDY-CURRENT SPEED CONTROL EQUIPMENT

cilities at Eastern's Keystone mine (also in southern West Virginia) are being enlarged. "Eastern is investing a record amount of money this year in the improvement of its properties," says W. B. Ross, vice president.

Jessop Builds Laboratory

Jessop Steel Co., Washington, Pa., has completed a new metallurgical laboratory at the headquarters of its Steel Warehousing Div., Broadview, Ill. Paul Gallagher is the metallurgist in charge. Included in the new customer service setup: Rockwell hardness tests, grain size ratings, microstructure and microcleanliness reports, and many qualitative chemical analyses.

McLouth Expands Plant

McLouth Steel Corp., Detroit, is expanding its Gibraltar, Mich., plant. The $7 million project will increase the firm's cold rolling capacity and will involve the extensions of buildings and the installation of more auxiliary equipment. It is scheduled to be completed in early 1962.

La Salle Enlarges Lab

La Salle Steel Co., Hammond, Ind., has completed a centralized quality control laboratory. The 4000 sq ft structure contains a newly equipped metallographic laboratory, spark and physical testing equipment, a chemical and photographic laboratory, and a complete machine shop for the preparation of test samples. The firm emphasizes the building of quality into products rather than inspecting them for quality.

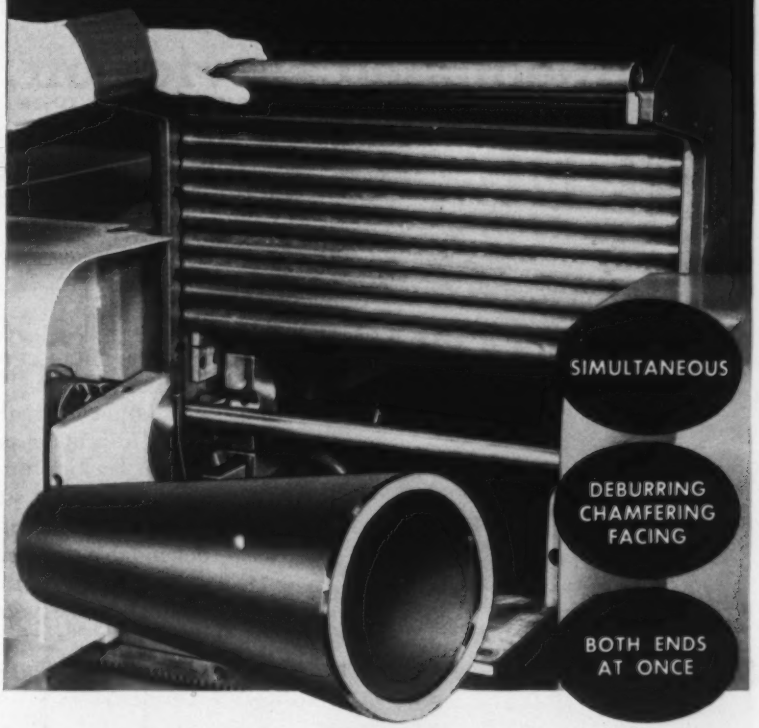
NEW PLANTS

Black & Decker Mfg. Co., Towson, Md., opened a factory service branch at 1296 36th St., Grand Rapids 8, Mich. J. Harold Taylor is the branch service manager.

Republic Aviation Corp., Farmingdale, N. Y., completed a $500,000 manufacturing research laboratory for developing techniques for the production of aerospace systems.

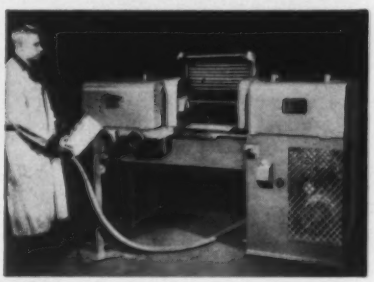
(*Please turn to Page* 110)

ANNOUNCING NEW PINES
DOUBLE-END FINISHING MACHINE



HIGH PRODUCTION • ACCURACY • FLEXIBILITY

Filling the need for high production speeds and low unit costs, the new Model 666 Double-End Finishing Machine produces up to 1500 finished pieces an hour, holding length tolerances within .005". This new standard machine performs simultaneous inside-outside deburring, chamfering and facing, or light forming operations on both ends of tube, pipe, or rod. Workpieces are handled in diameters from ½" minimum to 3" maximum in lengths up to 60" on the standard bed machine, up to 120" on the extended bed machine. Operation is completely automatic with workpieces fed into machining position by the hydraulically operated Chute-Matic feed. Setup is fast with precision control of each machine function, easy adjustment to specific work length, and quick-change tool holders. Tooling is inexpensive with throw-away carbide bits. Special tooling arrangements are available to accommodate dedimpling. Find out now how this machine can help you produce parts faster, and at less cost.



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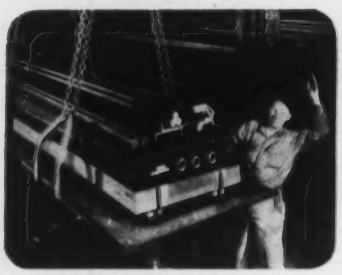
Specialists in Tube Fabricating Machinery
664 WALNUT • AURORA, ILLINOIS
PRODUCTION BENDING • DEBURRING • CHAMFER MACHINERY

unlimited selection –unequaled service on...

STEEL • ALUMINUM PLASTICS MACHINERY

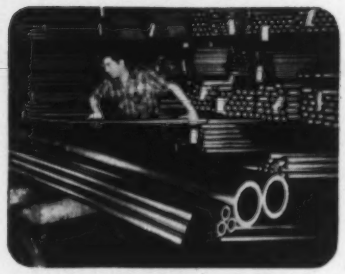


CARBON STEEL—No one even approaches the size and diversity of our stocks of hot rolled bars, plates, structurals. Published tolerances assure the industry's most exacting sawing, shearing and flame-cutting.

At Ryerson you will find the broadest selection of steel and aluminum in all types and sizes—plus plastics and machinery. Thus, you're assured of unbiased recommendations on material and metal-fabricating machines to speed production and reduce costs.

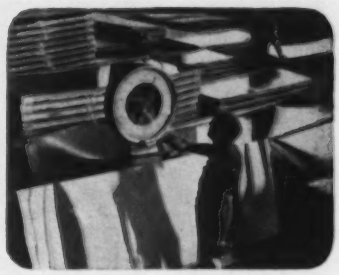
And backing up the size and diversity of stocks are these important services: certified quality controls; expert technical help; industry's closest cutting tolerances; dependable, on-time delivery.

Take a quick tour of Ryerson on these pages, then contact your Ryerson representative for details.

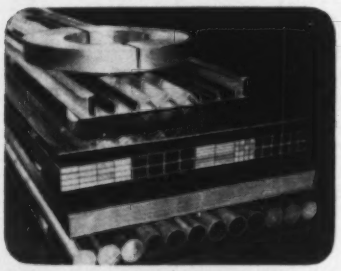


TUBING & CF BARS—Tubing: seamless and welded mechanical; structural; hydraulic cylinder & fluid line; Ledloy® 170. Bars: shafting, machinery steel, accuracy and screw stock, including fast-machining Ledloy 375 and 300.

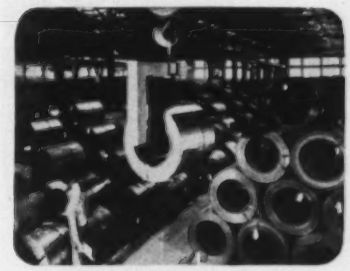
ALLOY STEEL—8-step certified quality program assures riskproof alloys—case-hardening, direct-hardening heat-treated alloys; leaded alloys, including fast-machining Rycut® steels; aircraft quality alloys; etc.



STAINLESS STEEL—2351 sizes, shapes, types and finishes in sheets, plates, bars, tubing, pipe and fittings, etc. All certified to meet ASTM, SAE, military, DuPont or GE specifications. Check in for fast stainless service.



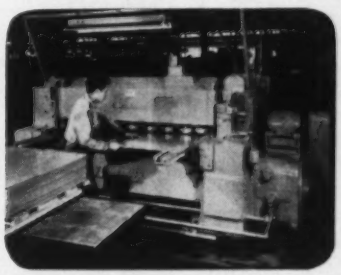
ALUMINUM—Nation-wide service on Reynolds aluminum includes all mill products: sheets, plates, tubing and pipe; wire rod and bar; structural and extruded shapes; construction products for buildings and highways.



SHEET & STRIP—More than 20 kinds of stock sizes—or we can cut sheets to your order with latest shears, slitters and cut-to-length lines for faster service. Also strip coils, etc. Call us for all your sheet and strip requirements.

INDUSTRIAL PLASTICS—Ryertex-Omicron PVC pipe, tubing, sheet and rod conquer more than 281 corrosives. Also rigid Kralastic and flexible polyethylene pipe and Ryertex® laminated phenolic resin plastics.

This big friction saw bites through a 24" beam in less than 12 seconds. The accuracy of Ryerson cutting on all types of equipment is the closest in the industry.



MACHINERY—More than 3800 types and models of metal-fabricating equipment for bending, braking, drilling, forming, hoisting, pressing, punching, rolling, sawing, shearing, threading and welding.

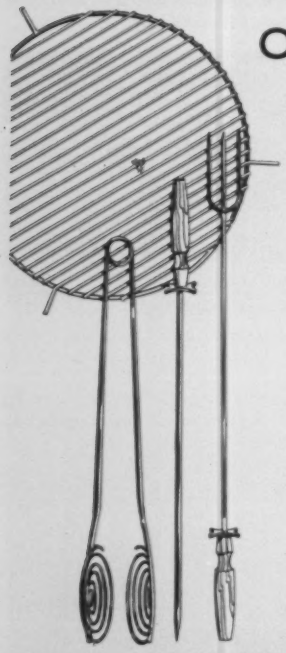
BE METALOGICAL—All the plus values of our products and service add up to giving you "optimum value for every purchasing dollar. Whatever you need—steel, aluminum, plastics, machinery—be Metalogical, call Ryerson.

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE REPUBLIC STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

Example: FINER "TOOLS" FOR OUTDOOR LIVING



There are no finer grills, implements or "tools" for outdoor living than those made from Continental Wire. There's a temper, gage and finish for almost any product—with smooth clean surface for fast production, and quality to take the forming you require for your product.

Your product may be entirely different—hardware for venetian blinds, or ball bearings, or automotive parts. For a wide variety of applications you can get just the right wire at Continental, in the temper, size, and steel analysis you require.

For your wire requirements in low, medium low, medium high or high carbon steels, round or special shaped, in many different coatings, drop us a line. Our mill technicians have solved hundreds of wire problems, and will be happy to give you the benefit of their experience. Write for free copy of the Continental Wire Manual.

WIRE SPECIALISTS FOR OVER HALF A CENTURY

CONTINENTAL STEEL
CORPORATION • KOKOMO • INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE®, BRYTITE®, FLAME SEALED®, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric. Nails, Continental Chain Link Fence and other products.

(*Concluded from Page 107*)

Connors Steel Div., Birmingham, **H. K. Porter Company Inc.**, opened a reinforcing bar fabricating facility at 2001 St. Ferdinand St., New Orleans, La. B. C. Blake is general manager of the division.

ASSOCIATIONS

Alloy Casting Institute, Garden City, N. Y., elected these officers: President, J. D. Hagans, Ohio Steel Foundry Co., Springfield, Ohio; vice president, J. W. MacKay, American Cast Iron Pipe Co., Birmingham; executive vice president and treasurer, E. A. Schoefer.

CONSOLIDATIONS

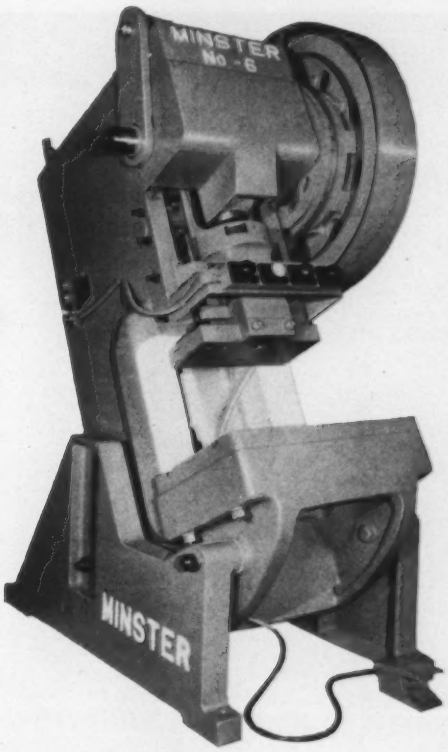
Environmental Engineering Div., Bethlehem Corp. (formerly Bethlehem Foundry & Machine Co.), Bethlehem, Pa., acquired the principal assets and equipment of **International Radiant Corp.**, New York. The division has acquired 30,000 sq ft of additional manufacturing space for its expanded operation. The corporation makes environmental test equipment.

Laboratory For Electronics Inc., Boston, and **Tracerlab Inc.**, Waltham, Mass., will merge, subject to approval of stockholders. LFE will be the surviving corporation.

Radiation Dynamics Inc., Westbury, N. Y., acquired controlling interest in **Advanced Research Corp.**, West Lafayette, Ind.

Pacific Industries Inc., San Francisco, acquired **Reliable Steel Supply Co.**, Los Angeles, producer of heating and ventilating supplies and distributor of industrial supplies.

Ling-Temco Electronics Inc., Garland, Tex., and **Chance Vought Corp.**, Dallas, have merged to form Ling-Temco-Vought Inc., effective Aug. 31. Chance Vought Corp. will be re-established as the aerospace subsidiary of the consolidated firm. Officers will include: Chairman and chief executive officer, Robert McCulloch; chairman of the executive



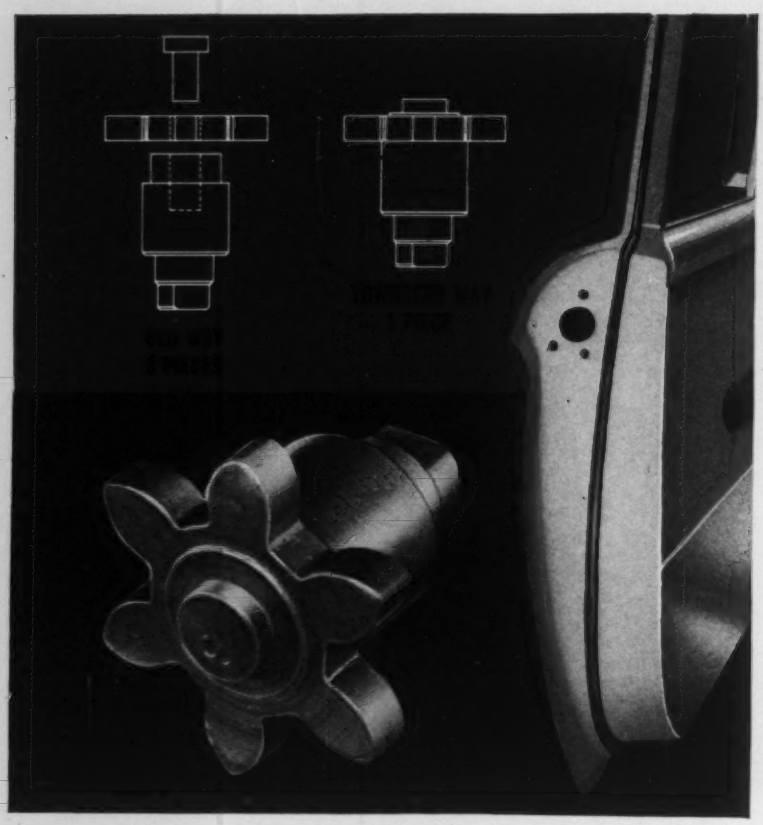
TAKE A LONG, HARD LOOK

at the "hidden strengths and values" found only in a Minster O.B.I. press. Quality is not always visible at first glance. The fine points of design and construction which mean the difference between good performance and superior performance can easily be overlooked.

When evaluating O.B.I. presses, carefully compare clutches, slide areas, recirculating lubrication systems, and inclining mechanisms. On any size—16 through 250 tons—a Minster O.B.I. offers you more value for your money. Ask a Minster representative to prove it.

The Minster Machine Company, Minster, Ohio

MINSTER®



Auto maker saved $22 per thousand with Townsend Ultra-Special part

This Ultra-Special part is made by the Townsend Ultra-Special cold-forming process for $22 less per thousand pieces than the former three-piece assembly made by another method.

One of these automobile door latch rotors is used in each car door by a major manufacturer. Their annual savings—by using this part—is quite substantial.

Cold forming adds strength to make a tougher part while holding dimensional tolerances. In developing these Ultra-Special parts, Townsend's engineers combine such processes as cold-heading and impact extrusion—or, interim heat treatments and coatings. The result is an extended range of standard production equipment far beyond ordinary limitations.

You benefit directly by using Townsend Ultra-Special parts in the assembly of your products. Your increase in profit potential is a direct combat to competition. A Townsend engineer will be happy to discuss your production assembly. Write Townsend Company, P. O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1816

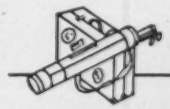
Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

In Canada: Parmenter-Bulloch Manufacturing Co., Limited, Gananoque, Ontario

committee, J. J. Ling; president, G. K. Johnson; executive vice president, Clyde Skeen; vice president and technical director, R. C. Blaylock; vice president, secretary, and treasurer, L. D. Webster; and vice president and controller, J. J. Kerley.

Cal-Tech Systems Inc., Glendale, Calif., acquired **Extrusion Corp. of America**, Gardena, Calif., producer of architectural aluminum extrusions. The operation will be integrated with Cal-Tech's Fullview Div., Glendale.



VACATIONS

National Machinery Co., Tiffin, Ohio, will close its factory and offices during the two weeks beginning July 24 and July 31. Limited crews will be available to handle emergency matters.

NEW OFFICES

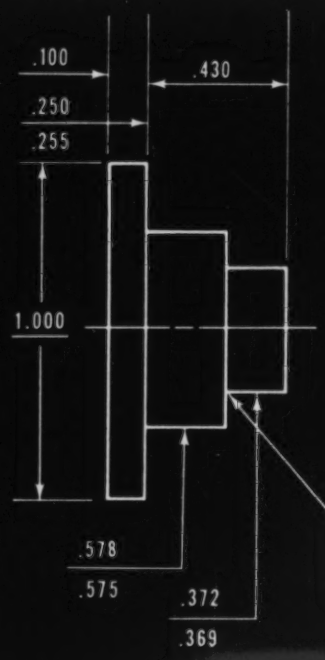
Anti-Corrosive Metal Products Co. Inc., Castleton - on - Hudson, N. Y., established a branch office in Indianapolis. Robert Lay is manager of the Indiana operation. The firm makes stainless steel and nylon fasteners.

NEW ADDRESSES

Textile Machine Works transferred the **J. L. Ferguson Co.** (purchased last April) from Joliet, Ill., to its Reading, Pa., plant where it is being operated as the Packomatic Div. The division produces packaging machinery.

Picker X-Ray Corp. opened its new headquarters office building at 1275 Mamaroneck Ave., White Plains, N. Y.

Rodney Davis Gear Co. moved to 235 W. Dauphin St., Philadelphia 33, Pa. The firm makes special gears and machine parts and distributes mechanical power transmission equipment. More than $150,000 worth of new machine tools have been installed in the 24,000 sq ft plant.



inside corners

SHARP AS POSSIBLE

KEYSTONE WIRE *flowability* does it!

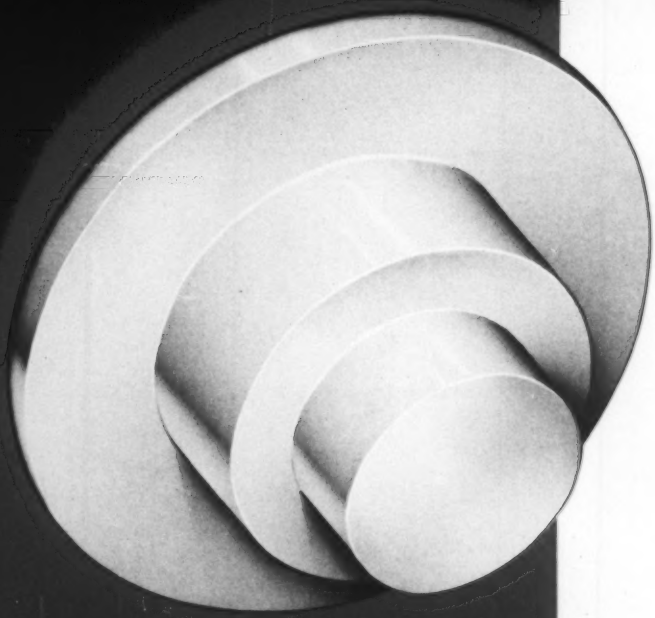
"Inside shoulders as sharp as possible," read the specifications for this shoulder rivet used in an automobile door assembly.

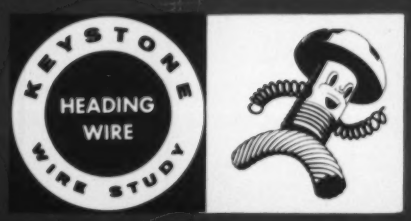
"Rockford"® Screw Products Co., Rockford, Illinois, makes this part from Keystone Direct Drawn Heading Quality Wire. In three blows, original .488″ diameter wire is extruded to .379″ diameter and severely upset to 1″ diameter. The head is consistently formed without cracking while holding to head diameter tolerances of ±.010″.

This special part, now made exclusively from Keystone Wire, is the result of extensive wire study. The flowability of this Keystone Wire allows the metal to completely fill the closed dies and achieve these sharp inside corners. Correct chemical analysis and closely controlled finish add to the successful cold heading of this shoulder rivet.

Our trained metallurgists and technicians are available to help solve your wire problems. Send us your specifications and we shall recommend the best steel analysis for you.

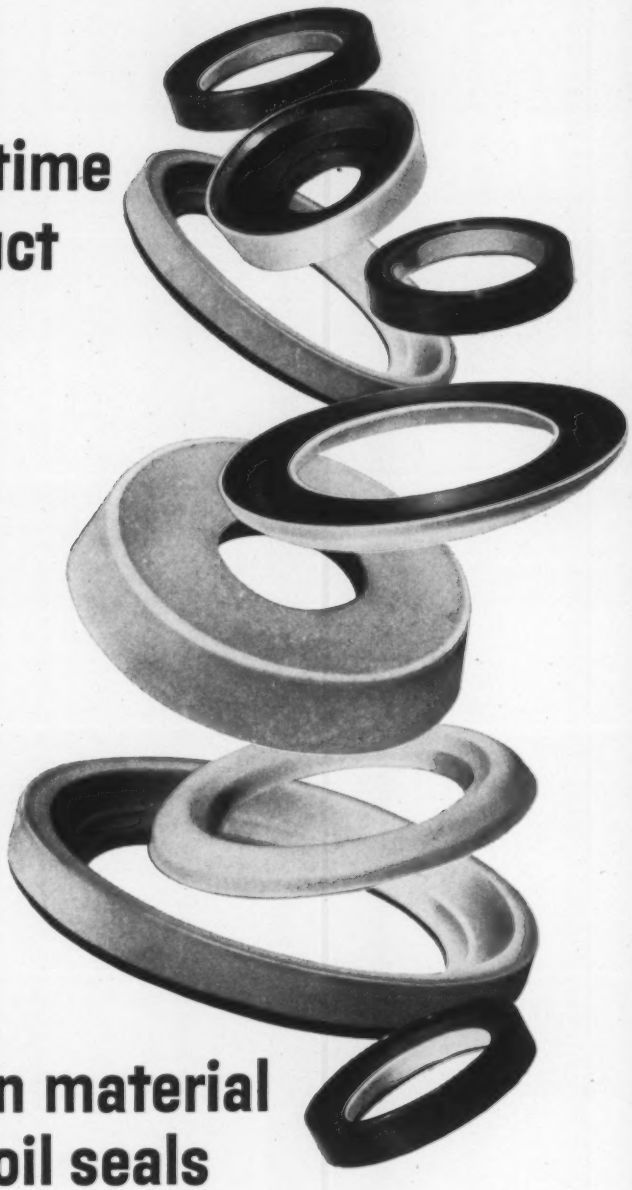
Keystone Steel & Wire Company, Peoria, Illinois





KEYSTONE
WIRE FOR INDUSTRY
MADE AT PEORIA, ILLINOIS, U.S.A.

IPC adds service time to your end product with "RULON"...*



the tested... filled fluorocarbon material for packings and oil seals

IPC now incorporates "RULON"* . . . a *filled fluorocarbon plastic material* . . . in packings, oil seals or precision molded products to answer your most critical sealing problems.

This new combination . . . "custom" molded and bonded for your specific application offers many advantages: Superior abrasion resistance, lower friction, improved sealing, less torque and reduced shaft wear.

Special molding and bonding techniques, developed by IPC for "RULON"* insure long wear and excellent performance. For your critical applications investigate the extras of IPC's latest "custom" approach! You'll find more benefits in handling increased pressures . . . higher shaft speeds . . . and temperature problems too!

**Trade Name of Dixon Corporation.*

IPC

OIL SEALS / PACKINGS / PRECISION MOLDING *Custom designed for your application.*

INTERNATIONAL PACKINGS CORPORATION

Bristol, New Hampshire

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P-2

Technical Outlook

MOLECULARIZED COMPUTER— Single, semiconductor crystals, "poisoned" with tiny impurities, can be made to perform functions now done by entire circuits of transistors, vacuum tubes, plus components, says Westinghouse Electric Corp., Pittsburgh. A device it is building (the Mol-E-Com) will weigh less than 15 lb, occupy less than 1/3 cu ft. A conventional transistorized computer of comparable capacity occupies 3 cu ft and weighs 175 lb.

TEST METEORITE RESISTANCE— A vacuum chamber 18 ft long and 6 ft in diameter can simulate altitudes of 75 miles for testing the resistance of structural items to the impact of tiny meteorites. Built by Tenney Engineering Inc., Union, N. J., the chamber is in use at Arnold Engineering Development Center, Tullahoma, Tenn.

RESEARCH CONVENIENCE— Eaton Mfg. Co.'s Detroit research center finds that central service pylons or consoles in the middle of each laboratory are a major convenience and time saving device. Each service center has electrical outlets (110 to 440 volts), water, air, vacuum, as well as compressed gases.

GAS UP— Use of oxygen in British steelmaking continues to increase. Added to combustion air for melting, it has cut fuel consumption as much as 14 per cent; in cold charged furnaces, tap to tap time dropped as much as 20 per cent; in hot metal furnaces, up to 12 per cent fuel saving and 8 to 15 per cent reduction in tap to tap time have been reported; lancing during refining has cut fuel cost as much as 65 per cent, and a pilot plant is in operation for spray refining—oxygen jets atomize the metal and react with the carbon at the same time.

LOOK HOW FAST— An optical method of measuring the speed of strip has applications in other industries, does not require contact. First suggested less than two years ago, it is about to go commercial. Two light sources about 15 in. apart each put a spot of light on the moving object. Two photocells view the spots. The variations are compared electronically, and the delay between duplications is used to determine the speed of movement. At 450 ft per minute, the resolving power of the unit is 1 part in 5000.

DUAL FUEL ROCKETS— A study at Boeing Co., Seattle, may help wed two sometimes competing rocket systems, solid and liquid fuels. The National Aeronautics & Space Administration has given Boeing a $100,000 contract to investigate development of large rockets with solid propellents in one or more stages and liquid propellents in the upper stages. The vehicle would be capable of placing 50,000 to 350,000 lb in a 300 mile earth orbit. The research should take about six months.

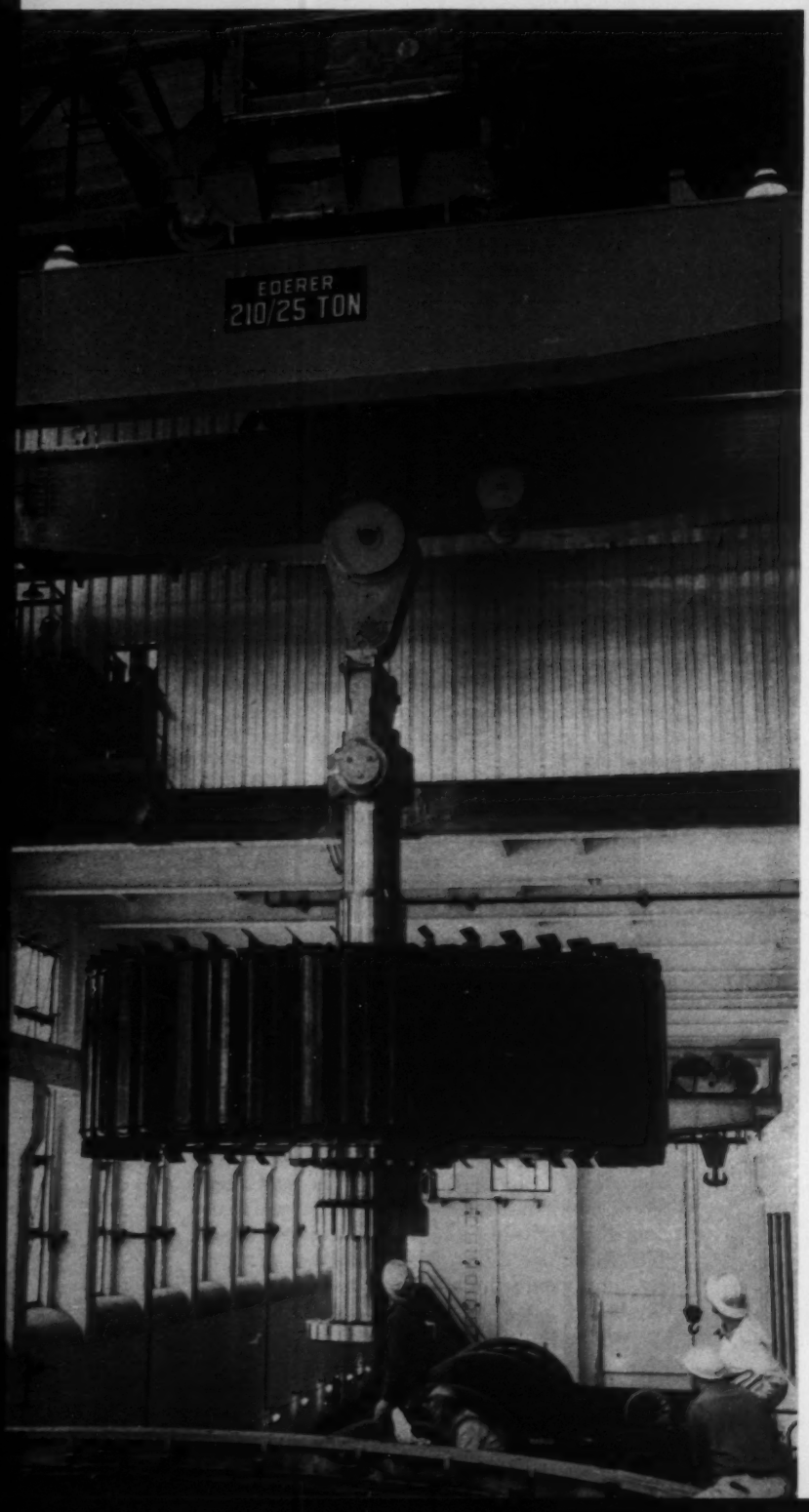
AIR ROLLERS— As strip becomes thinner, and speeds increase, drive and support rolls become tougher problems. A British group has tested air cushions for supporting strip; low pressure air is injected by means of nozzles between the strip and a guide surface. It eliminates the effects of roll inertia, and since there is no contact with the guide surface, there is no friction or scratching of the strip. Researchers report that tracking doesn't necessitate high tension.

LOOKING ASKANCE— An inspection system for laminations in sheets employs an ultrasonic transmitter along one edge. Signals are reflected from the far edge, and sheets are rejected whenever the return signal passes a preset limit. The system has given good results at speeds of 80 ft per minute; next step will be 300 ft per minute. An oil film couples the head to the sheets.

ALUMINUM TRANSFORMER— Conceived as a "prototype of the standard power transformer of the future" a 20,000 kva all-aluminum unit has gone on line at Aluminum Co. of America's Massena, N. Y., Works. Built for Alcoa by General Electric Co., the transformer steps down 115,000 volts to 13,800 and 6900 volts. The magnetic core, interconnecting cables, and insulating parts are the only nonaluminum components of the transformer.

AC Crane Motors Gain Popularity in

● *Improved controls provide smoother lifts*



● *Foundry, warehouse*

• ALTERNATING current will be used more generally in the foreseeable future for hoist and drive motors in heavy duty crane applications—such as the installation and servicing of extremely heavy machinery, or the handling of ladles and coils in steel mills.

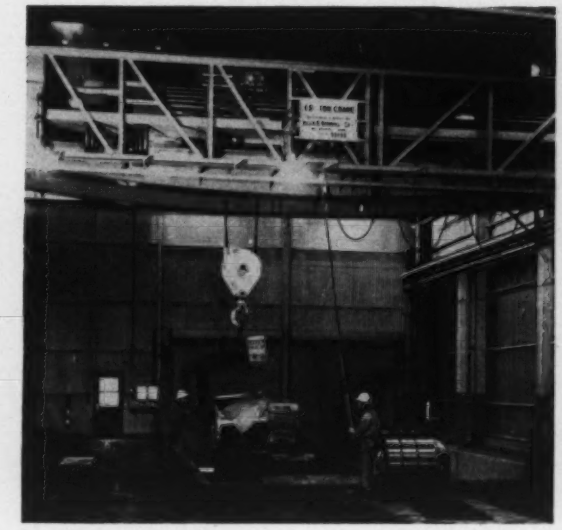
That opinion is voiced by several builders of overhead, traveling cranes. But some experts say that where service is severe and close control is a critical factor, popularity of dc units will stay high.

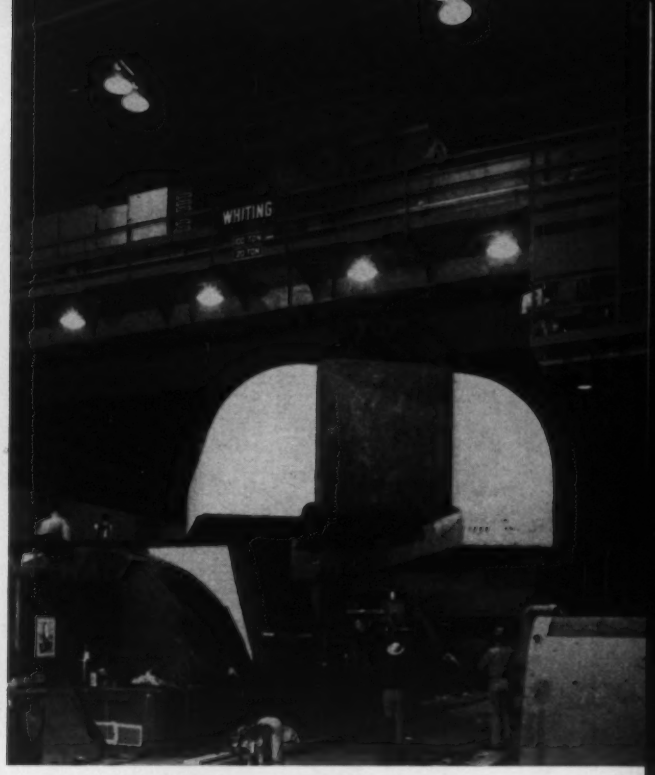
• Improvements in drive and control components could triple the percentage of ac cranes in heavy service in the next five years.

Technological advances in control components should extend the use of ac crane motors, says T. J. Winter, field sales manager, Wright Hoist Div., York, Pa., of American Chain & Cable Co. Inc.

"More consideration will be given to alternating current motors on new installations," says R. F. Rice, manager, Crane Dept., Whiting Corp., Harvey, Ill. "We don't expect existing dc machines to be replaced with ac equipment, because of the cost. But in the next

Heavy Duty Areas





cranes are remotely controlled; larger units are run from cab or floor

five years, we expect about 20 per cent of the new installations that would normally use dc to be built for alternating current."

Fred B. Brower, sales engineer, Victor R. Browning & Co. Inc., Willoughby, Ohio, estimates that 80 per cent of all industiral cranes (excluding steel mills) use ac motors. A. L. Trentadue, assistant sales manager, Milwaukee Crane Div., Cudahy, Wis., of Novo Industrial Corp., says 90 per cent. And a spokesman for Monorail & Crane Div., Philadelphia, of Morris, Wheeler & Co., guesstimates as high as 98 per cent.

"About 90 per cent of steel mill cranes are operating on direct current," says Browning's Mr. Brower. "But that figure could drop to 70 per cent in the next five years."

• The nod may go again to dc drives, if technology doesn't advance on schedule.

A spokesman for Ederer Engineering Co., Seattle, feels the pendulum of popularity could swing toward dc if static type, ac drives don't prove out. Robert G. Birkin, general sales manager, Cleveland Crane & Engineering Co., Wickliffe, Ohio, says: "We feel that future use of ac mill cranes will depend largely on results from the first installations." (U. S. Steel Corp. is putting ac cranes in its new plate mill at Gary, Ind.)

• Crane capacity requirements don't usually determine the choice of direct or alternating current motors.

There's no particular limit on the size of ac or dc motors, or on the size of cranes and hoists that use them, says G. H. Schroeder, manager, sales engineering, Euclid Crane & Hoist Co., Cleveland.

D. A. Schaitberger, vice president-sales, Northern Engineering Works, Detroit, says his company is producing cranes up to 150 ton capacity, with ac hoists and drives. Cranes of that size with ac motors are also being built by Conco Engineering Works Inc., Mendota, Ill., a subsidiary of H. D. Conkey & Co. And cranes with capacities up to 200 tons are being made on special order by Lakeside Bridge & Steel Co., Milwaukee. Total lifting capacities up to 600 tons are reported for multiple hook, ac cranes built by Whiting Corp.

• Availability of ac or dc power affects installation and operating costs.

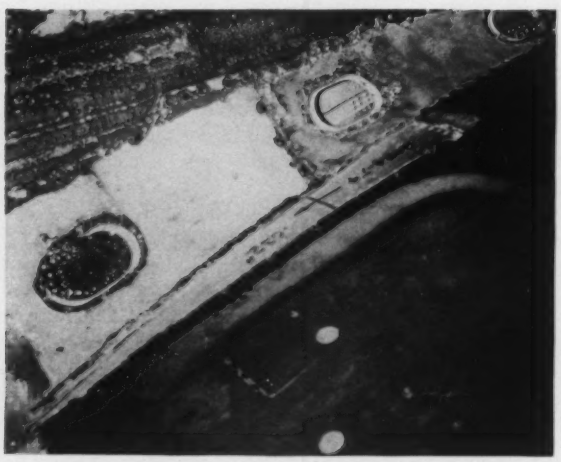
Direct current operation is more economical in some basic industries, such as steel, where companies generate their own current and have a preponderance of dc equipment. That's the opinion of Rodger A. Metz, sales manager, Hoist & Crane Div., Robbins & Myers Inc., Springfield, Ohio. Plants that buy power from public utilities find ac operation more feasible.

"Prices are about the same for ac and dc motors used on 5 to 20 ton cranes of medium span when standard duty motors are used and controls are fairly simple." That from Mr. Schroeder, of Euclid Crane & Hoist. He continues: "On dc installations, it is common practice—especially in steel mills—to use heavier duty motors and exploit all the advantages of dc operation, such as overload or overspeed without equipment damage. In such cases, dc cranes cost about 7.5 per cent more than ac. But if newer, stepless, or other electronic controls are applied to ac systems to approximate dc performance, the cost might run 5 to 10 per cent more than for dc."

Coils (left and right) produce curve on screen to match graph overlay. Test piece placed in right coil must match master (left). Variations in hardness or composition produce characteristically identifiable curve

Long employed by quality control to pinpoint hidden defects . . .

Eddy Currents Tried for New Roles



These fire damaged areas were checked with a Magnaflux FM-100 eddy current tester. Fire affected areas are outlined by Martin Co., Baltimore

• THE POTENTIAL of eddy current testers in inspection and quality control systems has not been approximated, experts believe.

Their reasons are based on the technique's exceptionally broad range of capabilities. For example:

• Such instruments determine metal hardness and can detect slight differences between one piece and another.

• In some cases, the technique has proved a better indicator of ultimate tensile strength than hardness.

• The devices can often predict part performance, including failure, better than conventional methods.

Add to those the capacity to measure electrical and thermal conductivity, to determine grain structures and orientation, to detect variations in chemical composition, and the detection of buried flaws.

A few drawbacks remain. Experts name, for example: Correlation of the instrument with known and unknown variables which affect readings. In some tubing, extremely minute defects must be detected. As sensitivity to such defects increases, so do the effects of harmless variables. Like many nondestructive testing machines, operation under the direction of a highly trained expert is desirable.

• An instrument at the Lima, Ohio, plant of Ford Motor Co., illustrates how eddy currents handle standard ferrous parts. Laboratory tests are encouraging, say technicians.

Briefly, here's how an eddy current system works. Two coils in such a system can be electrically balanced. When one is a reference, the other sensing coil can measure the conductivity of a metal. When the sensing coil is close to or in contact with a metal sample, its electrical "balance" is changed. Response can be measured with a meter or by an oscilloscope. An operator then reads the electrical values from the meter, or compares the oscilloscope curve with a prepared graph superimposed on the screen.

Ford's instrument has an oscilloscope. The device can detect core and case hardness of piston pins, case depth, decarburization, and surface nitrogen in bolts and other parts. Ford calls such parts "critical" with regard to engine function.

The eddy current tester is set up by a lab technician who conducts destructive tests to establish the machine's ability to compare the chemical and metallurgical properties of an incoming piece against those of a known good part. Charts, test settings, and master samples are developed by cutting samples, checking hardness, microstructure, microetching, and chemical analysis until two or more good parts have been identified.

Masters and charts based on the two good parts are employed in future sampling. Unskilled operators can run the machine by simply following directions and comparing the curve on an incoming part with the one established for the good part. Those which deviate can be rechecked with normal laboratory tests.

"The unit is an extension of regular tests performed by receiving inspection and the laboratory. Large sample lots can be handled, increasing reliability and on occasion saving time and material," state Ford officials.

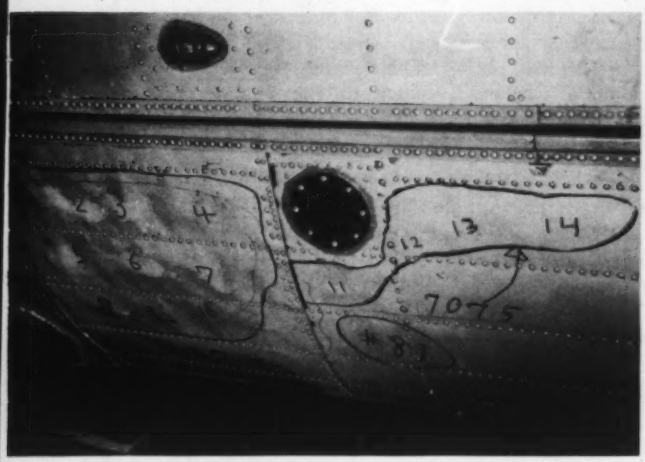
• A unique example demonstrates how the tester can pick up extremely minor variations that will predict the performance of parts.

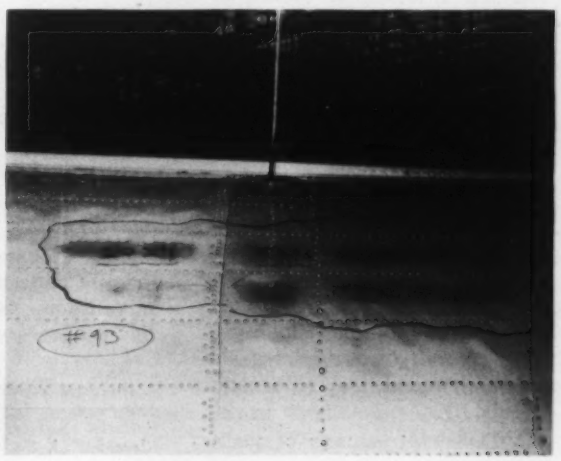
An equipment firm has a flat, springlike piece employed as a reinforcement to distribute stress over a large area of a flat pan. The eddy current tester accurately and repeatedly predicts which pieces will fail even though all other measurements, including hardness and microstructure, show that parts are identical.

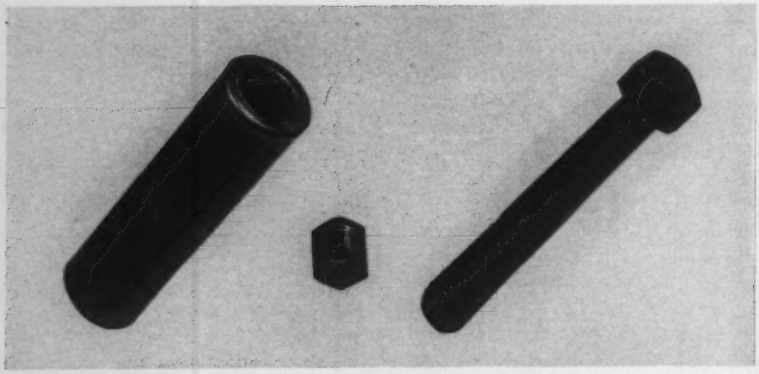
The device also detects and analyzes slight differences in nitriding. Lack of case depth and nitrogen or hydrogen embrittlement can be quickly spotted once certain values (such as curves) have been established from known samples.

Ford employs a single frequency machine. Engineers have increased its electrical input to induce a rich harmonic output. That adds to flexibility and sensitivity. Only machines which have a wide range of basic frequencies are considered better.

• Some firms find eddy current testers valuable standby tools which can be adapted to handle short







Ferrous parts are often run through laboratory checks at Ford Motor Co.'s Lima, Ohio, plant. Results are expected to encourage management to install 100 per cent inspection of "critical" engine parts

term trouble areas. Detecting stray pieces which miss heat treating, or parts made from a similar but unsatisfactory metal composition are typical examples.

Marlin-Rockwell Corp., Jamestown, N. Y., was confronted with a problem of detecting a few bearing rings that were "dead soft." The firm bought a Magnaflux unit (Magnaflux Corp., Chicago, a subsidiary of General Mills Inc.) to cut the cost of 100 per cent inspection during the emergency. "It did an efficient job of sorting out a few stray rings," stated Clarence Kooistra, corporate quality manager. "As we installed better heat treatment controls, we discontinued 100 per cent testing, but we still employ the instrument to run experimental checks on various properties and qualities of steel."

• Aircraft people have found eddy current instruments valuable in determining tensile strength and condition on a variety of metals, including aluminum.

Not long ago (see STEEL, Apr. 3, p. 88), North American Aviation Inc., Los Angeles, revealed that eddy currents could accurately determine the point at which Armco 17-7 PH stainless reached its maximum strength. Other firms, including A. V. Roe-Canada (Toronto, Ont.), Beech Aircraft Corp. (Wichita, Kans.), and the Phoenix, Ariz., plant of Reynolds Metals Co., have found eddy current instruments accurate in determining aluminum hardness, say Magnaflux officials.

D. D. Seltzer, manager of quality and reliability laboratories, Martin Co., Baltimore, says that eddy current measurements of the conductivities of fire damaged aluminum parts on airplanes are accurate, consistent, and reliable. His tests and studies have been carried out primarily on 2024-T4 and 7075-T6 alloys.

Here are some of his conclusions:

1. Conductivity measured with eddy currents correlates well with hardness and strength in overaged 2024-T4.

2. Estimates of tensile strength can be based on conductivity measurements alone. If material is evaluated with hardness tests, its strength can be placed within exceptionally narrow limits.

3. Bars of dubious quality 2024 can be identified and sorted with eddy currents.

4. A conductivity meter (eddy current) does a better job of estimating tensile strength than a portable hardness tester.

5. Statistical studies of production material confirm the accuracy of a conductivity meter. Further, they indicate that all material below strength requirements can be reliably identified.

(In some cases, Mr. Seltzer's conclusions can be applied to 7075-T6 as well.)

Tests were carried out on clean metal. Conductivity readings will be varied by paint films and cladding, states Mr. Seltzer.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

New Shellmaking Process Tumbles Metal Cost

A NEW manufacturing process developed by United States Hoffman Machinery Corp., New York, will save the government $19 a ton on the cost of steel used to make 175 mm shells.

With the technique, the company has landed a $5,061,381 contract to make the shells at its Scranton, Pa., plant; $201,021 of the contract money will provide the tooling to be installed between now and the beginning of production.

Arnold Erlanger, executive vice president in charge of ordnance, reports: "New precision manufacturing techniques have reduced metal scrap and cut the amount of steel needed to forge shells. Shell steel formerly was produced in bar mills. Now, lower cost commercial of the same carbon content can be produced in billet mills more economically."

Lt. Gen. J. H. Hinrich, chief of Army Ordnance, terms the manufacturing process the "most significant advance in shell production since World War II."

The contract award is part of the Ordnance Corps program for ammunition and conventional weapons which is expected to amount to $768 million during 1961.

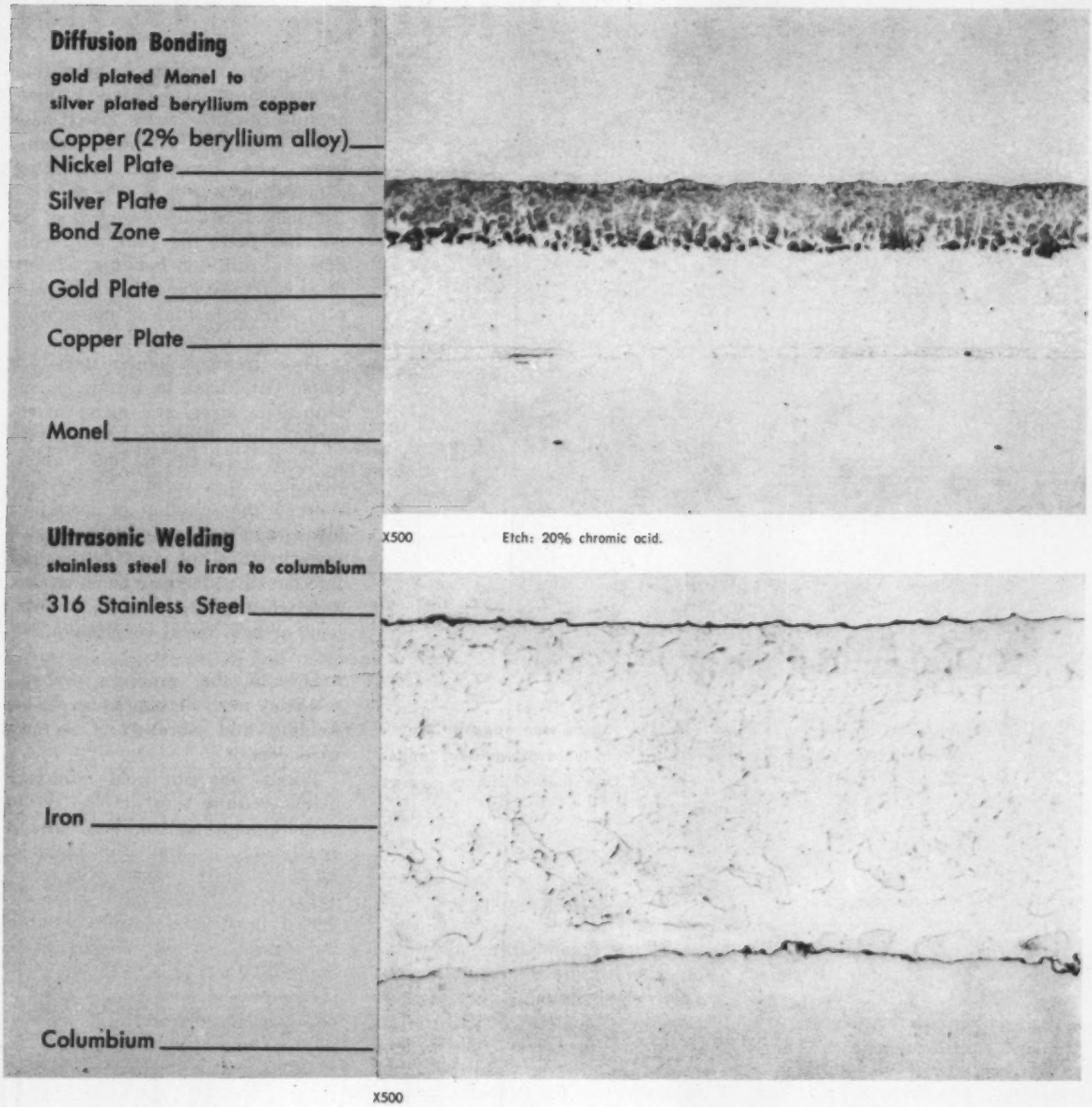
Induction Hardening Takes Place of Valve Inserts

ONE OF the leading automakers is eliminating valve inserts on an engine by induction hardening the valve seats.

The switch reportedly adds efficiency to the engine and makes it more reliable. Manufacturing costs also are expected to drop.

On each of the four exhaust valve seats, a 3/32 in. ring is hardened to 40 to 50 Rockwell C. The machine that does the job is a 100 kw, 10,000 cycle, Tocco (Ohio Crankshaft Co., Cleveland) unit that will turn out 120 cylinder heads an hour.

Tocco says the machine has a double cycle (preheat and high power), and that it is completely adaptable to automated lines.



Welding Keeps Up With Uncommon Metals

• NEW PROCESSES for joining uncommon materials are developed almost as fast as applications of such materials appear, declares R. E. Monroe, assistant chief, Battelle Memorial Institute, Columbus, Ohio.

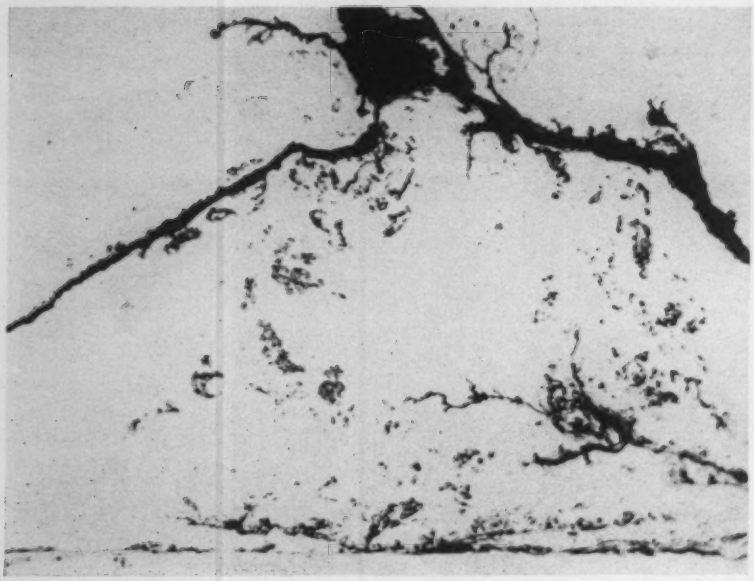
Some welding methods, such as electron beam, ultrasonic, and modified arc, have been improved to meet such needs. Others, like plasma jet, diffusion bonding, and brazing, are being examined in a new perspective.

Here are Mr. Monroe's ideas of the potentials, limitations, and refinements of the best processes for handling uncommon metals like tungsten, columbium, molybdenum, titanium, zirconium, and beryllium.

• Electron beam welding eliminates contamination. The process makes exceptionally narrow welds.

Parts to be joined are bombarded in a vacuum by a stream of high energy electrons producing heat as they strike the work. By concentrating and controlling the beam, you can fuse the edges of the parts.

Source of the electrons in such equipment is a heated filament. Beam diameters vary from $\frac{1}{8}$ in. to less than 0.010 in. They are focused and controlled by either charged plates (electrostatic) or



X500 Etch: 1 HF, 30 HNO_3, 30 lactic.

Some Problems Remain

Ultrasonic welding, for example, has solved some problems (see opposite page), but has not solved others. As shown above, ultrasonic weld of titanium (upper layer) to 316 stainless steel shows severe cracks. One theory: Higher energy inputs may overcome the existing difficulties

magnetic coils (electromagnetic).

The greater the voltage employed, the more energy is imparted to the workpiece. Welder potentials range from 5000 to 150,000 volts. Although electrostatic focusing is simpler, electromagnetic allows greater concentration of a beam. A small spot penetrates deeply, leaving a narrow fusion zone. Single pass welds have been made in aluminum 2 in. thick, and depth to width ratios can be 20 to 1.

The electron beam's high vacuum is its most valuable asset. Even the finest argon or helium atmospheres can't achieve comparable purity.

• Ultrasonic welding is especially helpful in joining dissimilar metals, says Mr. Monroe. Much effort is being made to understand its fundamental principles.

A transducer converts electrical energy to mechanical energy (vibration). Sliding adjoining metal faces together under some pressure breaks up oxide layers, removes surface peaks, and heats the metal interface, permitting the metals to interact and join.

Welding dissimilar metals ultrasonically has great potential, many experts claim. Notable successes with some metal combinations are offset by failure in others. Some believe that larger, more powerful machines will overcome the problem. Equipment is being made for tests.

• Modified arcwelding processes (Short Arc, Dip Transfer, Microwire) offer help in welding uncommon metals. Weld pools are small, easily shielded, and permit faster welding than is possible with standard tungsten electrode techniques.

Such modified processes must shield welds in uncommon metals with an inert gas despite the fact some were developed for carbon dioxide. Originally developed for thin gage sheets, the modified methods rely on welding conditions adjusted to give intentional short circuits between the electrode and the molten weld pool. They employ lower than normal currents and voltages and properly designed power sources.

• Diffusion bonding is promising because joints can be made at temperatures which don't affect base metal properties. Titanium, columbium, and zirconium are being joined that way.

Nuclear reactor construction, so far, has been the principal beneficiary of diffusion bonding. Closely fitted parts are joined through pressure without melting or measurably deforming the components.

Three common joint systems are employed: Metal to metal, an intermediate layer, and metal to ceramic. Intermediate layers have probably received the most attention since they permit greater latitude in the selection of materials, lower bonding temperatures, give better control of any detrimental intermetallics, increase bonding rate, and when plated, eliminate problems of base metal composition.

• Several other processes are still relatively new: Plasma jet, explosive welding, and vibration of an arcweld deposit.

Plasma jets can weld refractory metals because they develop exceptionally high temperatures. Major problem is to limit the high jet force.

Explosive welds have been reported by a number of operators, but much research remains to be done in that area. Principal advantage researchers expect: Welding of multiple pieces during an explosive forming operation.

Welds with smaller grain sizes (and improved mechanical properties) have been made here and in Russia by applying vibration to the molten pool of weld metal during arcwelding. Main obstacle: How to couple the vibratory energy to a weld pool.

• In many cases, brazing is the most satisfactory technique for joining uncommon metals. Main improvements have resulted from better alloys and heating methods.

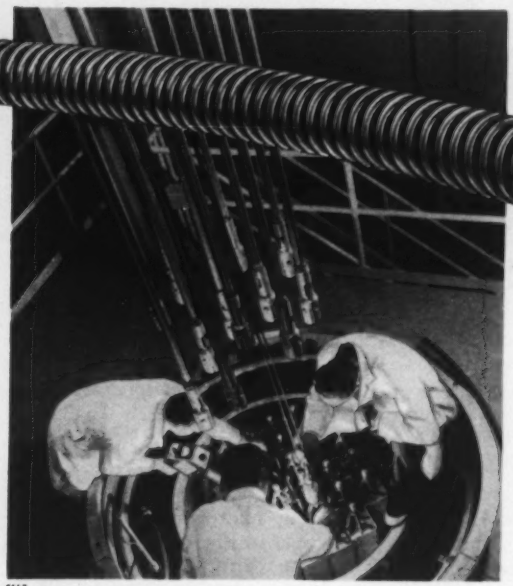
Experts foresee extension of brazing techniques. Research and development is going on in three areas: Brazing alloys which do not react with base metals; self-fluxing alloys which simplify atmosphere (shielding) requirements; and elimination of cleaning after brazing.

"Scram" Springs Halt Nuclear Hazards

Whether installed in a ship for propulsion, or on land for electric-power generation, a nuclear reactor running wild is highly dangerous. In case of malfunction or overload, neutron-absorbing rods must be driven fast into the nuclear pile to halt fission.

For emergency scramming or driving the rods, the mechanical system utilizing coil springs offers a high degree of safety, reliability, and performance. The springs are under constant load while the reactor is operating, and stability under load is mandatory. They must retain their strength at high stress levels and show minimum load loss at temperatures beyond even 500°F. The material must be highly corrosion resistant and relatively unaffected by radiation.

Meeting exacting precision and performance requirements is no novelty for A.S.C. springmakers. From nuclear applications to automobiles and home appliances, A.S.C. Divisions offer engineering, mechanical and metallurgical resources unequalled in the spring industry. If such broad experience can be of benefit in your present or future developments, call in an A.S.C. Division.



6117

"Scram" springs act in emergency conditions to drive neutron-absorbing rods into the nuclear pile to halt fission.

Tight specifications and controls govern the "scram" spring from wire to finished product. During each stage of manufacture, tolerances are carefully checked by precision instruments.

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
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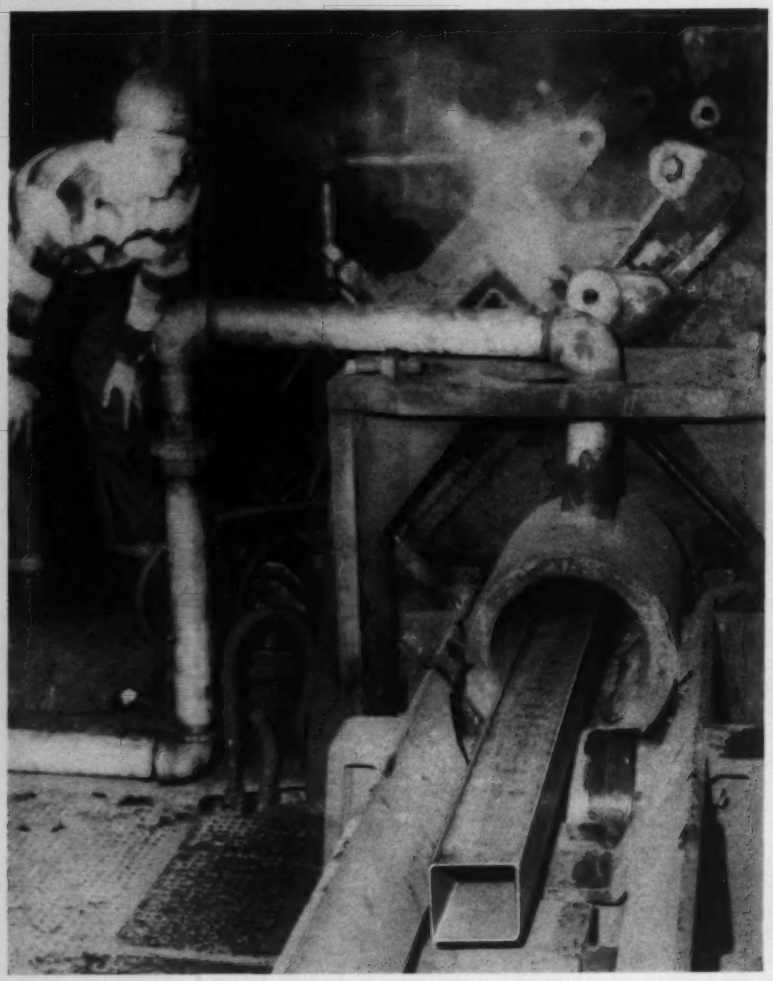


Hot rolled section leaves the sizing mill . . .

Square Tubing Introduced As Structural Material

• USE of tubular structurals in building construction and mechanical applications may be stimulated by the availability of square and rectangular sections in a wide size range at attractive prices.

Such material is being produced continuously at the National Works, McKeesport, Pa., of National Tube Div., United States Steel Corp., and at the corporation's Fairless Works, Fairless Hills, Pa.

Previously, tubing in squares and rectangles was a specialty item that required extensive tooling and handling, says National Tube. But a new process puts the product in the same general price range with other structurals.

The sections are said to be extremely adaptable to modular construction, and to integrate well with windows, mullions, and partitions. Load bearing columns don't need to be boxed in, but can be left exposed, with a simple finish. Extensive mechanical applications are also expected, because of the material's torsion resistance, fabricability, and low maintenance cost.

• Workability of the tubular sections has been improved by new technological developments.

The structurals are said to be adaptable to most fabricating operations. Ductility is good; the tubing bends well, flattens, cuts, punches, flares, and flanges easily. It can be welded by commonly employed methods.

New welding techniques make it possible to connect the total cross section of one tube to that of another. Result: A more effective transfer of forces within the structure, and a weight saving of up to 60 per cent over some structurals. Exploitation of that weight saving can make a building 30 to 40 per cent lighter than one made with conventional members, says National Tube. Other benefits: Lower construction costs, lower freight charges, and faster erection.

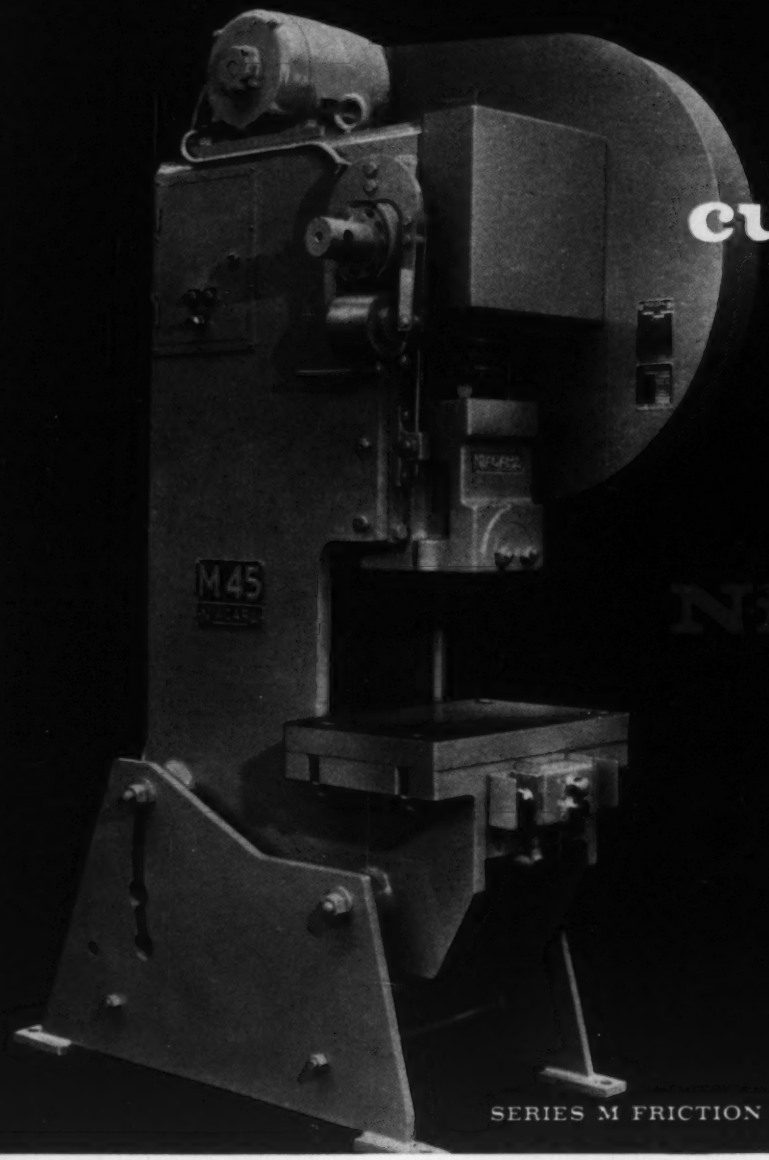
Continuous, welded joints provide good compression and torsion resistance. Sealing insures long resistance to interior corrosion.

• High strength-to-weight ratio is built into tubing that's designed specifically for structural uses.

The division's process was developed for rolling tubing to structural specifications. Roll passes were designed for the Fairless and National mills. Several costly operations were eliminated, so the tubing could be made on standard mill equipment.

The hot rolled, carbon steel structurals are available in 1 in. to 8 in. squares, and in rectangles 2 in. by 3 in. up to 4 in. by 6 in. They are being made at present from ASTM A7 steel, which has yield strength of 33,000 psi, and from ASTM A36 steel, which has a yield strength of 36,000 psi. Other grades, including high strength steels, are adaptable to the process.

Previously, tubing used for structural purposes was designed and tested for fluid carrying characteristics. Structural applications were secondary; the architect or designer had to pay extra for nonapplicable quality control. And the tubing usually had walls that were heavier than needed for structural use.



what customers like most about Niagara's new OBI line

SERIES M FRICTION CLUTCH OBI

Already in the field and on the job in substantial numbers, the new Series M is drawing a very significant response from production people. Here, briefly, are the features generating the most comment:

EXTRA RUGGED, NEW WELDED STEEL FRAME . . . surpasses in stiffness even the high standards by which Niagara OBI's have been known for years. Dramatically less vertical and angular deflection prolongs die life, assures uniformity of work.

FULLY ENCLOSED DRIVE . . . improves safety factor by eliminating exposed rotating parts. Front guard shields operator from oil splashes.

COMPACT BUILT-IN PRESS CONTROL . . . assembled with the latest in compact components. Nothing protrudes.

SLOW, LOW ENERGY, POWER-OFF JOGGING . . . When in "Jog" position, the Selector Switch *disconnects main motor.* Pressing 2 palm buttons (both hands) brings slide down slowly and smoothly. A separate motor jog button permits small shots of energy to be restored to flywheel as required. Die-setting is easier, faster, safer.

EXTRA LONG, RIGID SLIDE . . . prevents deflection of guiding ways. Exceptionally generous front-to-back mounting space, with mounting holes in front, rear, and sides, gives dies more solid support. New design provides for circulating oil and keeps oil out of die area.

Niagara Series M OBI Presses are available in 4 sizes (both non-geared and single geared) with shaft diameters from 2½" to 4" and capacities from 22 to 60 tons. A specialized design is built for automatic ultra high speed production. For the full story, send today for Bulletin 54. Niagara Machine & Tool Works, Buffalo 11, N. Y. District Offices and Distributors Everywhere.

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America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

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Roller Drive System Offers Advantages

• LOW FREQUENCY induction motors using a floating design offer manifold advantages for roller table drives, reports Bogue Electric Mfg. Co., Paterson, N. J.

- Mechanical and electrical reliability (stable low speeds for ac motors).
- High electrical efficiency.
- Low maintenance.
- Elimination of special couplings or bedplates.
- Compactness.
- Ability to withstand prolonged stalling without damage.

• Applications include transfer tables, descaling and desurfacing tables, work rolls for rolling mills, runout and extension tables, furnace rolls, and cooling beds.

A typical system for a plate mill roller table might use 100 motors (1 hp) capable of operating from 19 to 78 revolutions per minute and a low frequency converter rated at 1.3 to 5.2 cycles per second. The manufacturer says speeds as low as 10 revolutions per minute are obtainable (through selection of frequency and motor design).

• The floating motor design makes the rotor an integral part of the roller assembly.

Frame rotation is prevented by a special tiebar and no differential movement is possible between the roller and the motor (the motor's only solid contact is the driven shaft). No gears or transmissions are used.

The motors are usually started at minimum frequency to keep starting currents and heat losses at a minimum and then accelerated by increasing the frequency. The motors can be braked by reducing the frequency or reversed and plugged.

Power factor at starting is high. Inrush current is effective in producing high torque with a minimum of heating losses, says Bogue. Motors may be stalled at full voltage for considerable periods.

The converter consists of a rotor having slip rings at one end and a commutator at the other. The 3 phase, 60 cycle current is fed to the slip rings and then by rotating the rotor against the resulting magnetic field, any desired low frequency may be obtained from the commutator (depending on the speed of mechanical rotation). Little power is required to drive the converter rotor—only enough to overcome friction and windage. For example: A 70 kva, 6 cycle converter requires a 15 hp driving motor. Due to special brush and brush holder construction and a patented commutating winding design, minimum brush life is said to be 8000 hours.

Carbon Lining Increases Blast Furnace Capacity

CARBON BRICK lining has increased the capacity of a blast furnace at the Zug Island plant of Great Lakes Steel Corp., Detroit, a subsidiary of National Steel Corp.

The carbon lining was applied in the hearth wall, bosh, and tuyere breast. Replacement of the previous hearth wall with a thinner (15 in. thick) carbon lining made it possible to increase hearth diameter from 28 ft to 29½, and boosted iron output to about 2000 tons a day.

Straight line blast temperatures of about 1700° F have been maintained since the rebuild, which was completed in late 1958. The moisture level in the blast has been held at 16 to 18 grains. After 900,000 tons of iron were cast, core drilling of the bosh section revealed a stabilized lining thickness of 10 to 12 in., instead of the predicted 9 in.

The company attributes the success of the carbon lining to effective bosh cooling. The bosh jacket cooling system covers about 90 per cent of the external bosh surface, and carbon bricks were beveled to fit the bosh contour to make a tight fit against the shell.

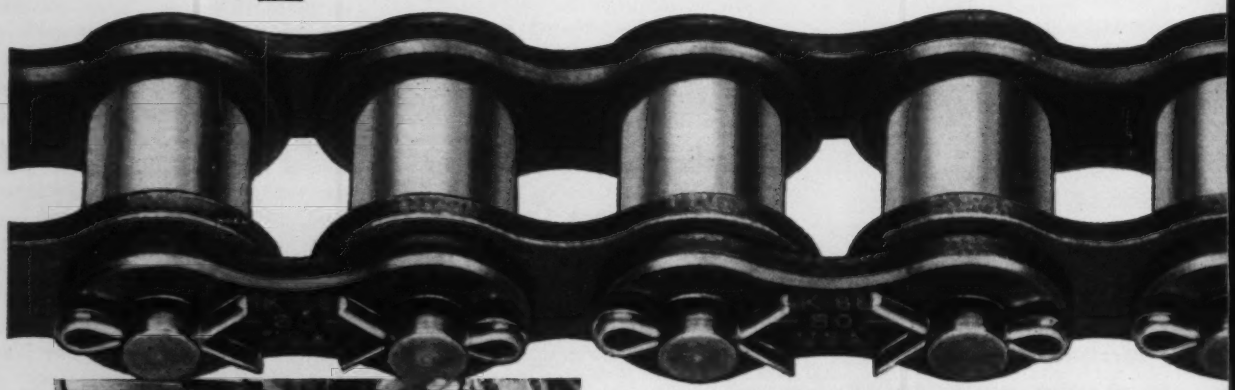
The bricks were supplied by National Carbon Co., New York, a division of Union Carbide Corp.

Pockmarked but Not Penetrated

ALUMINUM got a passing mark in the form of a big, ugly, round scar in ballistic tests to prove its worth for armor plate. A 37 mm, high explosive shell, fired directly at a weld, failed to penetrate. David Witt, group supervisor, Ordnance Section, Proof & Development Section, U. S. Army, Aberdeen Proving Ground, Md., shows the kind of ammunition used.

HIDDEN VALUES like these assure Link-Belt roller chain of

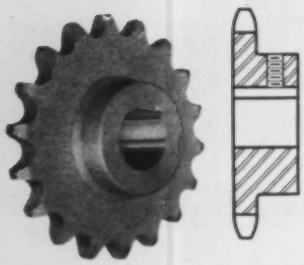
full power, full life



UNIFORM STRENGTH OF CHAIN PARTS, well above accepted standards, is assured through exact control of all heat-treating processes. With equipment and instrumentation exactly tailored to the need, all processes are carefully adjusted to suit the characteristics of each heat and analysis of steel. Result: Link-Belt precision steel roller-chain has the strength to absorb shock loads, deliver full power under continuous heavy going.

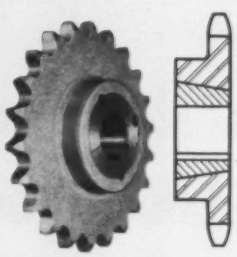
UNIFORMITY OF CHAIN PARTS is rigidly controlled in every step of Link-Belt's precision steel roller chain production. The optical comparator is an example of the wide variety of specialized equipment used to assure precise manufacturing control of chain parts and tools. It is capable of magnification up to 100 times to inspect chain parts and the tools that make them.

Precision power partners for LINK-BELT roller chain. All available



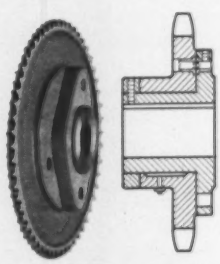
FOR LOW COST . . .
FINISHED BORE SPROCKETS

Available for the most widely used single-strand roller chains. They are stocked in a range of popular bores, complete with keyseat and set screw.



FOR EASY INSTALLATION . . .
TAPER LOCK SPROCKETS

Stocked in a wide range of sizes for single- and double-strand chains. Bushings are offered in 1/16" bore increments, complete with keyseat.



FOR OVERLOAD PROTECTION . . .
SHEAR PIN SPROCKETS

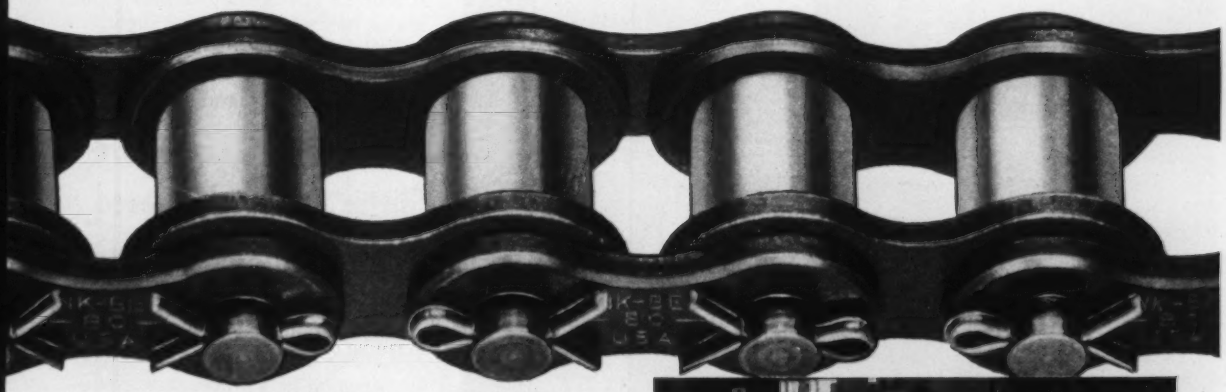
Protect equipment against overload damage. Necked pin shears at an exact calculated load, disconnects sprocket and hub. Pin easily replaced. No adjustments needed.

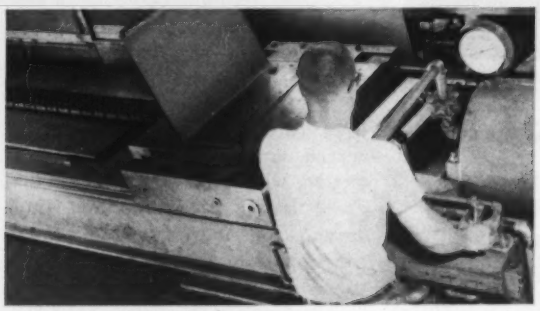
ahead

Shown below are just a few of the many *hidden values* that contribute to the greater strength and endurance . . . the longer service life of Link-Belt roller chain.

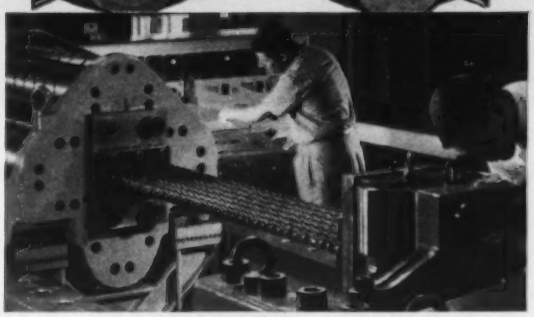
Combined, these features assure you of precision chain that can easily cope with today's heavy loads and high speeds. It has exceptional resistance to fatigue . . . shrugs off the punishing effects of sprocket engagement, shock of starting loads, centrifugal loads and other operational stresses . . . provides long-term efficiency and economy.

For engineering assistance in applying the roller chain, manufactured to give you full power, full life, contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under CHAINS in the yellow pages of your telephone directory.



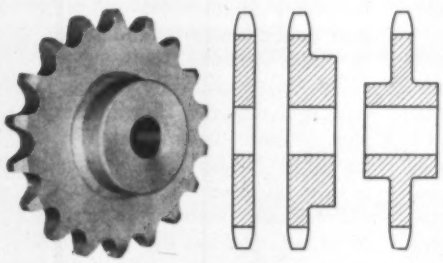


UNIFORM LOAD DISTRIBUTION across multiple-strand roller chain is essential so that each strand carries its fair share of the load. That's why Link-Belt's prestressing is so vital. Prestressing seats and cold-works the chain joint parts, assures equal load distribution and reduces elongation in service—of special value on fixed-center drives.



TOP FATIGUE STRENGTH of Link-Belt roller chain is verified on the test equipment shown above. With it, Link-Belt has proved conclusively the superior fatigue resistance imparted to roller chain by its patented FR (Fatigue-Resistant) process. The machine produces up to 65 tons of high speed cyclic tension—rapid "stress-on, stress-off" action that duplicates actual operating conditions at an accelerated pace.

off-the-shelf.



FOR SPECIAL MACHINING . . .
MANDREL BORE SPROCKETS

Available in a broad range of sizes for remachining to individual bore or keyseat requirements. Three types: (A) no hubs; (B) one hub; (C) hubs on both sides.

LINK-BELT

ROLLER CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World.

15.694

Vacuum pouring removes hydrogen, other gases . . .

535,000 lb Ingot Forged Into High Strength Rotor

• ABILITY to vacuum cast a 535,000 lb ingot enabled Bethlehem Steel Co. to forge a large generator rotor in one piece. Results: A greatly reduced level of hydrogen and other gases, providing a sounder, tougher, cleaner ingot with flaking and microcracking practically eliminated.

In addition, the one piece rotor has eliminated time consuming, complicated, and expensive bolting together of rotor sections. The unit is part of an 800,000 kw steam turbine being built by General Electric Co. for the Tennessee Valley Authority.

• Four electric furnaces were tapped consecutively, 9 minutes apart, to supply nickel-molybdenum-vanadium alloy steel.

The ingot, 8 tons heavier than any previously cast, says the company, was poured on a split second schedule that took 36 minutes 15 seconds. The mold's dimensions: 120 in. in diameter and 175 in. high. It slipped into the vacuum chamber with about ½ in. to spare. In forging, the ingot will be brought to a uniform temperature over a period of about 80 hours at about 2300° F and then worked on for nearly an hour in a 7500 ton press forge. It will next be reheated for 20 to 24 hours and returned to the press forge for another 2½ hours for final shaping.

After forging, body diameter will be 67¾ in., body length, 284½ in. and over-all length, 510 in. Heat treating will provide a minimum yield strength of 70,000 psi and a minimum tensile strength of 92,000 lb. The part will be rough machined to 64⅝ in. body diameter, and 274⅝ in. body length. Rough machined weight: 288,917 lb, about half of the original ingot.

Following inspection, the rotor will be shipped to the customer for finish machining and insertion of blades.

Slitter Output Increased By Power Strapping Setup

SLIT COIL production has been tripled at United Flat Rolled Products Co., Chicago, thanks to conveyorization and proper use of powered steel strapping equipment. The equipment was supplied by Acme Steel Products Div., Acme Steel Co., Chicago.

Inclined conveyors carry coils from each slitting machine to a curved, roller mounted conveyor section, which can be rotated 90 degrees to line up with either conveyor. Coils move from the curved conveyor onto an indexing table in front of the strapping machine. The coil is elevated by tapered rollers, and strap is fed from below the center of the coil. The operator inserts the strap end in the machine and presses a cycle button to initiate automatic tensioning, sealing, and cutting. Another button is actuated to position the coil for the next strap. When three or four straps have been applied, the coil is lowered to the conveyor and rolled to the stacking station.

Up to 12 coils are stacked on skids and moved to the final strapping station, where four, ¾ by 0.035 in. bands are applied to unitize the load.

Previously, coils were strapped with hand tools as they were taken from the rewinder. That process caused up to 45 minutes of downtime per hour, as slitting equipment waited for strapping and removal of the material.

Local Business Scores Again! On this, our Twentieth Anniversary, we salute the energy and foresight of thousands of businessmen and executives in every part of the land for their continuing support of the Payroll Savings Plan for U.S. Savings Bonds. For twenty years, they have seen the Payroll Savings Plan pay off in more local buying power. They've seen it help create more efficient and confident employees. They've seen it as a hard-to-beat employee benefit program. They've seen it improve labor relations and cut employee turnover. They've seen it strengthen the economic sinews of the nation.

How about you? Why not install this plan now or learn the many ways to improve participation in your existing plan. Send for complete brochure. Call your State Savings Bonds Director or write: U.S. Savings Bonds Division, Treasury Department, Washington 25, D.C.

20th ANNIVERSARY 1941 ☆ 1961

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from phidias - - to lamb - - to you

Millenniums of time separate the ancient wonder of the statue of Zeus, and the modern multi-station transfer machine. Despite the centuries between them, both are alike in their broadness of concept, one in the field of art, the other in technology.

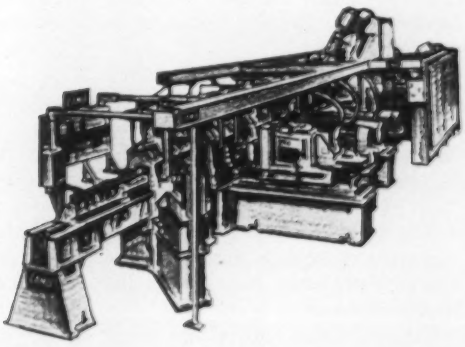
The leaders of ancient Greece selected Phidias to create the statue of Zeus because he alone was capable of a work that expressed their feeling for the Father of the Gods. Today —broadness of engineering concept is mandatory in designing and building high output machinery capable of producing work to precision tolerances and at minimum cost per piece. That is why progressive companies are turning to Lamb for solutions to mass-production manufacturing problems.

Unlike Phidias' Zeus, the result of Lamb's engineering is here – NOW – for all to see and use. Investigate the Lamb concept before you decide on any type of production machinery

Statue of Zeus at Olympia

One of the "Seven Wonders of the Ancient World" . . . masterpiece of Phidias, greatest sculpture of ancient Greece. Forty feet high, this bejeweled ivory giant wore a golden robe and was enthroned in a temple at Olympia. It was carried to Constantinople by the conquering Turks and destroyed by a great fire in 476 A.D.

One of a series of paintings by Mario Larrinaga, commissioned by F. Jos. Lamb Co. Copies suitable for framing available on request.

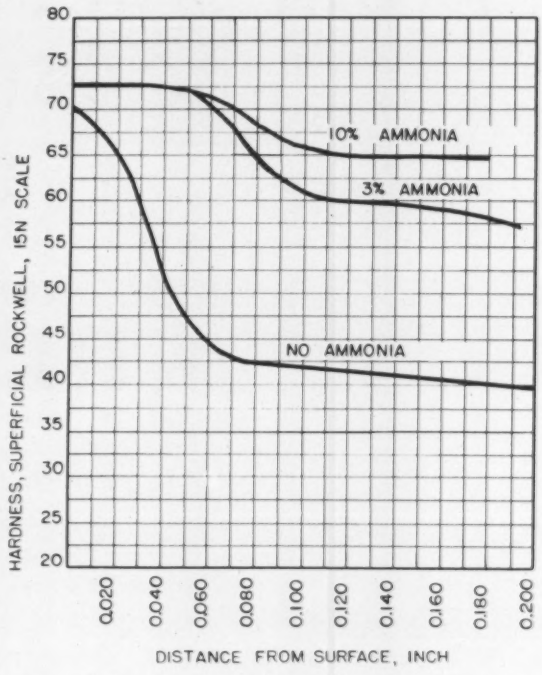


F. JOS. LAMB CO.

5663 E. NINE MILE ROAD • DETROIT 34, MICHIGAN

Since 1914 Engineers and Builders of Special Machines and Automation Equipment

Measurements are affected by voids in metal, but . . .



Ammonia in atmosphere affects hardness

Iron Powder Part Hardness Gains Through

• TO HEAT TREAT parts made from iron powder, try a carbonitriding atmosphere, suggests Vernon Pryer, Gramix project engineer, United States Graphite Co., Saginaw, Mich., a division of Wickes Co. The added nitrogen improves hardenability. Result: Hardness is more uniform.

Based on studies of various processes, the company has standardized on carbonitriding atmospheres for hardening and carburizing, Mr. Pryer reports.

• The nature of iron powder parts makes for changes in the heat treating required, calls for care in interpreting results.

Laws of heat treatment aren't repealed for powder metallurgy parts, but treatment is complicated by the porous nature of the product. Heat conductivity is lessened, there is an apparent increase in penetration rates in carburizing since the carburizing medium penetrates into the part, and greater care in quenching is called for because the pores act as stress raisers.

Care is called for in hardness measurements too. The lower the density of the part, the lower will be the apparent hardness; the reason is that the penetrator will take an "average" value across the solid metal and the voids. So, particularly in parts where low density is called for, the hardness will be checked with a file. The file test will show the part to be fully hard.

• Pack carburized parts gave hardness problems.

Powdered iron parts had been processed in pack carburizing equipment. Results were not always uniform, Mr. Pryer states. He notes that a tight scale formed on the parts in the process, and that it interfered with heat transfer during quenching. Result: Soft spots.

Another problem with pack carburized parts was "abnormal" microstructure. To obtain the desired lamellar pearlite, rapid cooling was required.

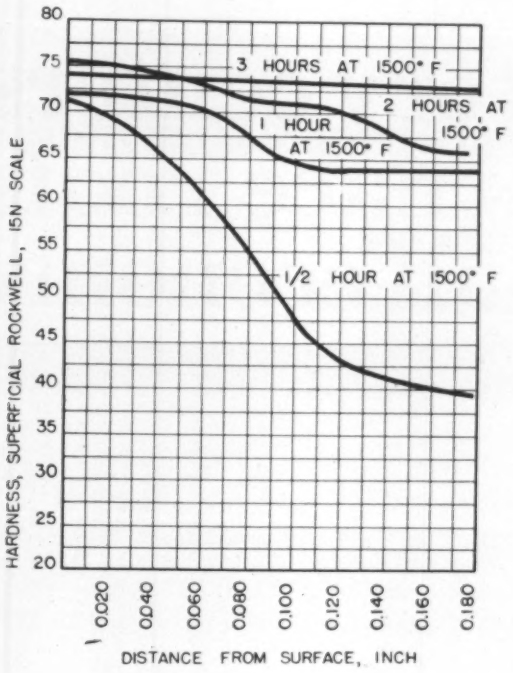
• Gas carburizing improved the results.

Higher uniformity was observed when parts made from iron powder were processed in a gas atmosphere, Mr. Pryer states. It permitted closer control of conditions and eliminated scale formation.

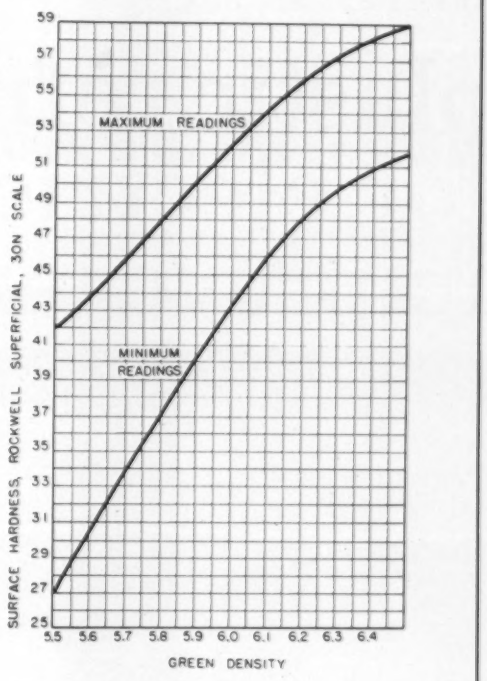
Variations were still found in hardness, although they were less than had been the case with pack hardening.

• Carbonitriding produced better uniformity.

The iron powders from which the parts are formed are usually of low



Longer times increase hardness and depth



Apparent hardness varies with density

Carbonitriding

alloy content. This limits the hardenability of the metal, often leading to inconsistent hardness patterns on quenching, particularly in oil.

It was found that the addition of ammonia to the gas atmosphere, or carbonitriding, aided hardenability. The nitrogen picked up by the iron acts as an alloying ingredient, so that quenching is more uniform. In the laboratory tests, more consistent results were obtained by the carbonitriding process than by any other tried, observes Mr. Pryer.

• The carbonitriding process has been adopted as standard at U. S. Graphite.

Two processes have been set up, one for the hardening of parts with combined carbon, the other for low carbon parts. Combined carbon, obtained by blending graphite with the powder before sintering, permits hardening without carburizing. Where highest density parts are required, carbon is usually added by carburizing.

Standard procedure for hardening parts containing combined carbon requires heating at 1550° F (in an atmosphere with 5 per cent ammonia, 10 per cent natural gas, 85 per cent endothermic gas) and soaking ½ hour. Quenching in a fast acting oil follows. Quenched parts are washed and tempered at 350° F.

Parts without combined carbon are heated to 1700° F in a carburizing atmosphere (10 per cent natural gas, 90 per cent endothermic gas) and are held at temperature for 3 hours; soaking time can be varied to modify the depth of case. Temperature is reduced to 1550° F before quenching in oil. Ammonia may be added at the reduced temperature if improved hardenability is needed. Again a 350° F tempering temperature is used.

Mr. Pryer states that the two processes outlined have held down dimensional changes in the parts.

• Laboratory studies determined the optimum conditions.

A box type laboratory furnace was used for the tests on carbonitriding. Operating temperature was 1500° F, with the dew point of the atmosphere held at 15 to 25° F. Composition of the atmosphere was usually 10 per cent ammonia (except for the tests to determine optimum ammonia concentration) with 7 per cent natural gas and 83 per cent endothermic gas.

Parts were made from Type MH/100 iron (Gramix Grade 411), compacted to a density of 6.0 and sintered.

The effect of adding the ammonia to the atmosphere was not only to increase the depth of hardness, but also to lift the surface hardness slightly. Over a substantial range, surface hardness varies almost directly with the density of the part, Mr. Pryer finds. That is the reason for the 6.0 specification on density for the trial runs; the value was necessary to obtain a minimum Rockwell hardness of 40 on the 30N scale.

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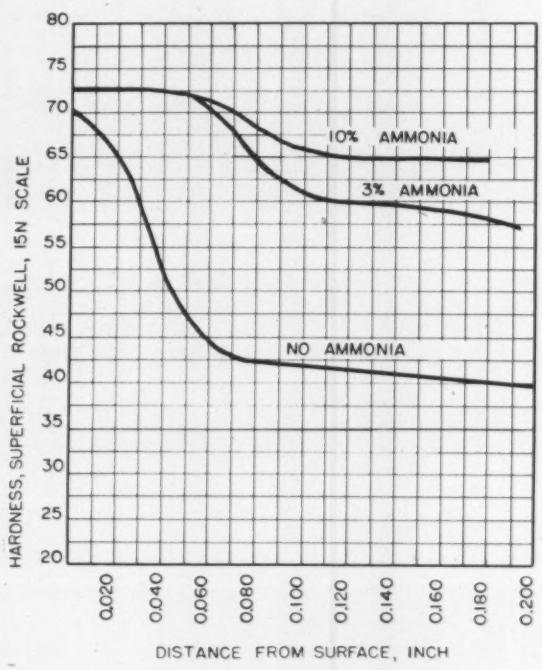

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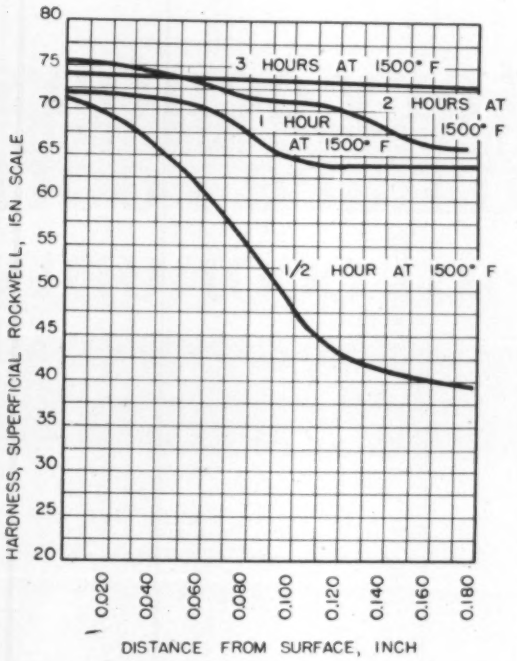

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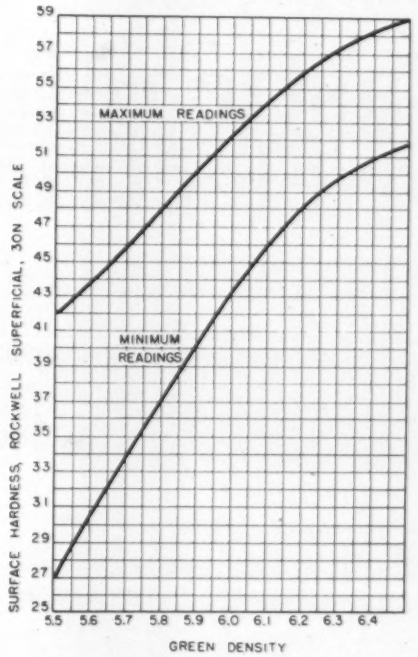

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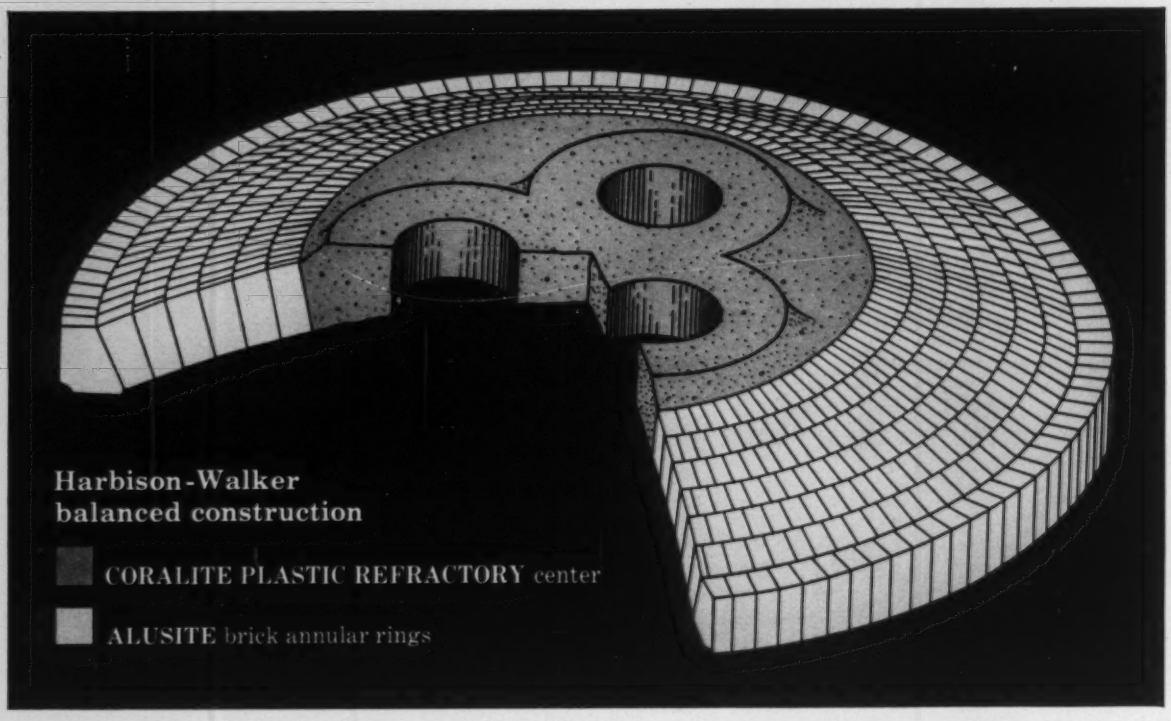
plastic refractory centers for electric furnace roofs improve over-all economy



In electric steelmelting furnaces, balanced roof life is very important in over-all furnace economy. The center section is of particular significance since it is exposed to the most severe service. In some cases the center section is replaced at least once before the annular rings are consumed.

The use of CORALITE PLASTIC REFRACTORY in the center section with ALUSITE 70% alumina brick of standard sizes in the annular rings achieves balanced wear pattern and over-all increase in service life. Some shops report increases of 20% or more.

The superior wear resistance of CORALITE PLASTIC REFRACTORY is attributable to high refractoriness, low permeability and outstanding resistance to thermal spalling. The plastic composition provides a degree of workability that can eliminate laminations during installation.

For less severe service, a balanced roof life can be obtained with H-W MULLITE PLASTIC REFRACTORY center sections and ALAMO superduty fireclay brick or ANCHOR DASH 60% alumina brick standard sizes in the annular rings. Write for further data.

HARBISON-WALKER REFRACTORIES COMPANY
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HW 61-8

Horizontal Boring Unit Handles Big, Heavy Parts

THIS 74,000 lb horizontal boring machine (DeVlieg's 5H-144 Spiramatic Jigmil) extends the company's Jigmil machining accuracy to larger and heavier parts.

Beside a 5 in. spindle, the machine shown has a 12 ft horizontal and a 6 ft vertical travel and is equipped with a Diatrol point-to-point dimensioning and positioning system. Diatrol is used to preselect co-ordinate dimensions for horizontal table movements and vertical action of the spindle head. The company's numerical tape control, called Tapac, may also be used with the unit.

Tool changes are fast. They can be made with the spindle bar in any position within its travel range. A power lock mechanism for that purpose can be locked or released in seconds.

A 20 hp motor provides direct power through a Spiramatic spindle head. Range of spindle bar travel is 24 in. In final assembly, the 24 ft, 33,000 lb bed is flat to within tenths with a basic accuracy of 0.0001 in. per foot for straightness and alignment on all working surfaces.

Optional features include a thermal control system for the main spindle, a depth control attachment (a rotating aluminum turret carrying 24 adjustable stops), and stainless steel way covers.

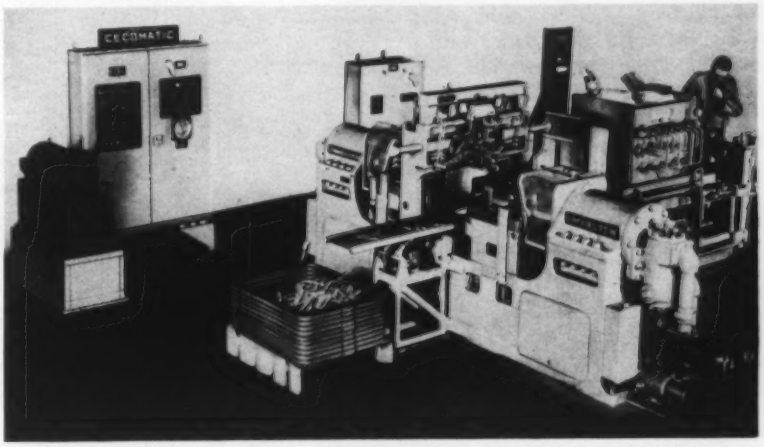
For further information, *write* DeVlieg Machine Co., Royal Oak, Mich.

Setup Produces Drop Forgings in Job Lots

THREE units have been designed for the production of a wide variety of drop forgings in job lot quantities. Known as the Cecomatic process, each unit consists of a Model C Impacter, a program controlled feed device, and an automatic gas fired furnace.

The manufacturer stresses flexibility. The setup may be incorporated into a shop equipped with automatic heating, or it may be manually loaded by an operator transferring the heated stock from the furnace to the loading point.

Advantages claimed include close operating control, production uni-



formity, low fixed charges, reduced labor requirements, safe working conditions, long die life, quick changeover, and low maintenance.

The Cecomatic process can be located next to ordinary manufacturing operations and even on upper floors, says the company. The unit can be made an integral part of a continuous production process. Direct labor costs have been reduced by eliminating the requirements for many manual skills.

Insert type dies are feasible in the Model C Impacter. The vertical die faces help remove scale from the impressions between forging blows. Results: Reduced scale impregnation and improved surface finish on the forging. In addition, minimum die contact helps to reduce the risk of heat checking, adds the company.

A two man crew can usually make a complete changeover in less than an hour without cooling down the furnace. Changing jobs means changing dies, setting up a new program on the control panel, and adjusting stock grips and handling devices. Automatic and semiautomatic setups are available.

For further information, *write* Chambersburg Engineering Co., Chambersburg, Pa.

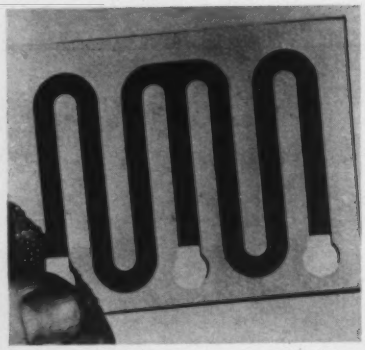
Compact Heating Element Made of Glass, Metal Film

LOW TEMPERATURE warming and spot heating are projected applications for a compact glass heating element. It's made by selectively coating a glass panel with a metallic film that forms an electrically conductive path.

The unit can produce temperatures in excess of 572° F with glass sizes from 1 to 27⅜ in. square and from 3/32 to ¼ in. thick.

In addition to its heating properties, the infrared reflecting qualities of the metallic film permit the unit to serve as a spot shield for delicate materials, says the manufacturer.

The glass is Pyrex No. 7740, a borosilicate with good insulating properties and corrosion and thermal shock resistance. The company adds that the film becomes essentially a part of the glass surface and does not normally rub, flake, peel, or wear off.



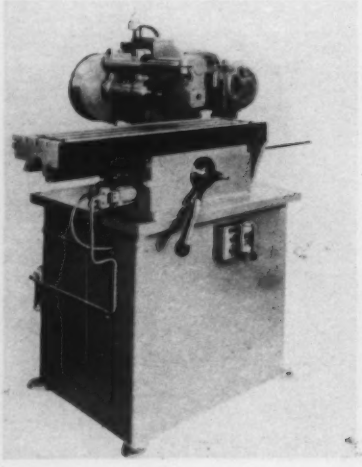
For further information, *write* Corning Glass Works, Corning, N. Y.

Modified Unit Handles Heavy Duty Milling

HEAVY duty performance in a small, highly versatile mill is the claim for a modification of the No. 1 U. S. Half/Mill with a heavy, box type table and slide.

It's designed to provide rapid production, rack and pinion, longitudinal, hand table feed. The unit features both air-hydraulic and manual rack and pinion, longitudinal table feed. It's also available with manual feed alone or with air-hydraulic or full hydraulic feed alone.

The column is mounted on a cross slide for in and out adjustment. A rigid, one piece, extended bed type, longitudinal slide mount is used. An overarm support gives added rigidity.



The company says the unit is capable of high performance slotting, sawing, face milling, keyway cutting, slab milling, boring, and other operations. Vertical rise and fall feed on the unit shown is 4½ in., cross feed 6 in., with longitudinal feeds available from 16 to 36 in. Table sizes offered range from 6½ x 27 in. to 10 x 54 in. (working surface).

For further information, *write* U. S.-Burke Machine Tool Div., Cincinnati Mfg. Corp., Cincinnati 27, Ohio.

Speed, Efficiency Stressed in Lift Trucks

SEVERAL series of lift trucks and a straddle truck carrier have been announced by Hyster.

High maneuverability in close quarters is featured on the Challenger 20 and 25 Series. A low center of gravity, handling ease, and visibility are emphasized. The company's Monotrol control system is available on the series. Working in combination with the power shift (Hystamatic) transmission, Monotrol combines forward-reverse selection and throttle in a single pedal.

The models are powered by a Continental, water cooled engine that provides a top travel speed of 12 mph and a hoist speed of 105 fpm.

In the 6000 to 10,000 lb capacity rating are the Hyster Space Saver, 60B, 70B, 80B and 100B trucks. The units are equipped with Monotrol and a two speed hoist system that cuts up and down traveling

FOR SAFETY YOU CAN SEE REMEMBER THE "V" FOR VISIBLE BLADES!

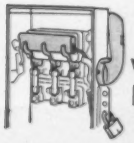
• The men who pull the switches will tell you what can happen when a switch, *believed* to be open —*isn't*. A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on **V**isible **B**lade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

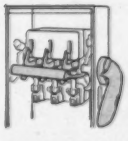
They cost no more... why settle for less?

Square D Company, Mercer Road, Lexington, Kentucky

Extra Safety with Square D's Handle Design



WHEN IT'S **UP** IT'S **ON!**



WHEN IT'S **DOWN** IT'S **OFF!**

Handle is integral part of switch, not cover. When door is opened, handle remains attached to switch. Eliminates hazard of false handle indication or defeat of padlock provision. When it's padlocked, it's locked!

SQUARE D COMPANY

wherever electricity is distributed and controlled

time by sensing weight loads and adjusting its speed accordingly. On the Challenger 60C-80C pneumatic tire series equipped with a two speed hoist, an average of 20 per cent more handling output can be realized, the company estimates.

Other developments include a 50,000 lb (capacity) Straddle Truck (designated the M500A) and design and engineering refinements on the H100C-120C, pneumatic tire, lift truck series. Series H100C-120C also uses the two speed hoist system.

For further information, *write* Hyster Co., P. O. Box 4318, Portland 8, Oreg.

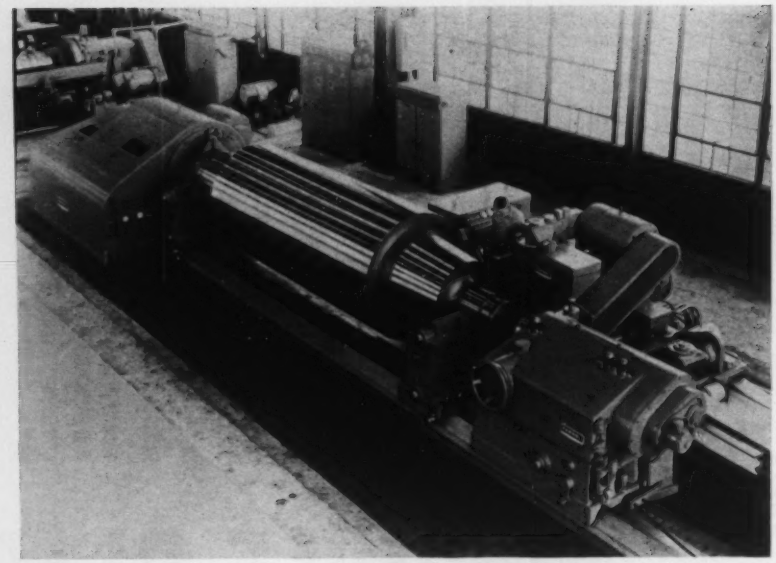
Milling Unit Can Take Wide Range of Materials

YOU CAN remove more than 2 to 3 cu in. of metal per minute per horsepower with the Veet 10 speed Speedmiller. The unit has 30 to 40 hp applied directly to the cutter spindle.

The unit can rapidly mill a wide variety of materials from cast iron to stainless steel. Any of ten speeds (37 to 900 rpm) can be instantly selected by single lever shift.

All gears are high tensile forgings with helical, crown shaved teeth. Gears are in constant mesh; clutches are shifted to change speeds.

For further information, *write* Veet Industries, 25753 Groesbeck Highway, East Detroit, Mich.



Roll Grinder Handles Jumbo Sizes

THIS LARGE roll grinder can handle rolls from 11 in. to 81 in. in diameter and in lengths up to 30 ft. It can carry 200 tons on centers and can be extended to grind rolls up to 40 ft long.

The inertia block protecting the roll being ground from vibration is supported by heavy duty springs. The springs insulate the grinder from other vibrations that can be set in motion by surrounding equipment. Design features include such things as trunnion tilting infeed and a crowning device that insure positive infeed and withdrawal of the grinding wheel without backlash. Another refinement: A semiautomatic wheel infeed. It compensates for wheel wear by feeding the wheel into the work at a constant controllable rate; it provides for optimum stock removal by keeping a constant load on the grind wheel motor.

The main wheel carriage is split to permit rotation of the upper section. Ways are adjustable to the desired taper and can be locked in place. The tapered necks on the rolls can be ground using the main wheel head with the same size grinding wheel and horsepower as for straight grinding.

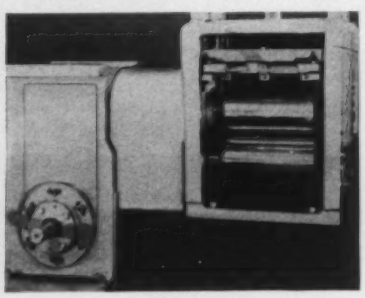
For further information, *write* Farrel-Birmingham Co., 148 Maple St., Ansonia, Conn.

Roll Feed Precise at 3000 in. per Minute

PRECISION feeding of stock at rates exceeding 3000 in. a minute is possible with a roll feed developed by Ferguson.

The mechanism: A roll assembly with hardened rolls, ground to high concentricity and supported by permanently lubricated, antifriction bearings, is coupled to the cam indexing mechanism. The lower roll is driven directly by the roller gear drive which provides positive stopping.

The upper roll is powered through gears permanently installed in the roller gear housing. The roll assembly is self-adjusting for variations in stock thickness with the pitch line of the gears remaining in precise location to help assure rotation of both rolls with constant velocity. Positive synchronization of movement is provided without backlash and there is never a need for adjustments other than changes in roll pressures to conform to the stock, says the company. Strokes up to 6 in. are available with the standard roll feed. Others can be provided for the Ferguson unit. Variations in feed lengths are made by exchanging rolls (with other diameters).



For further information, *write* Ferguson Machine Co., 7818 Maplewood Industrial Court, St. Louis 17, Mo.

Ceramic Permanent Magnet Resists Demagnetizing

APPLICATIONS that require high resistance to demagnetizing forces or where magnet length is limited can benefit from an oriented, ceramic, permanent magnet material (Indox VI-A). It is being produced for periodic focused, traveling wave tubes.

The manufacturer reports properties have been greatly improved over those of Indox VI. The magnet material has an intrinsic coercive force of 3000 oersteds at room temperature (68° F) and 2300 oersteds at −85° F.

The magnet has a maximum energy product of 2.55 million and a residual induction of 3300 gauss (also at room temperature). At −85° F, the properties are 3.4 million and 3830 gauss.

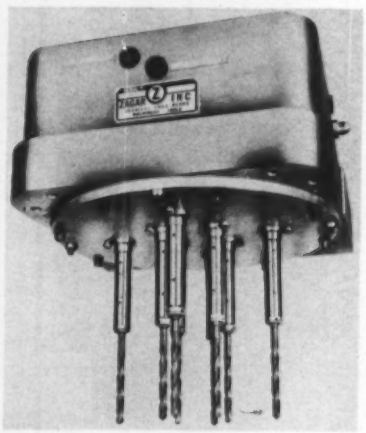
For further information, *write* Indiana Steel Products Div., Indiana General Corp., Valparaiso, Ind.

Slip Spindles Available On Multispindle Heads

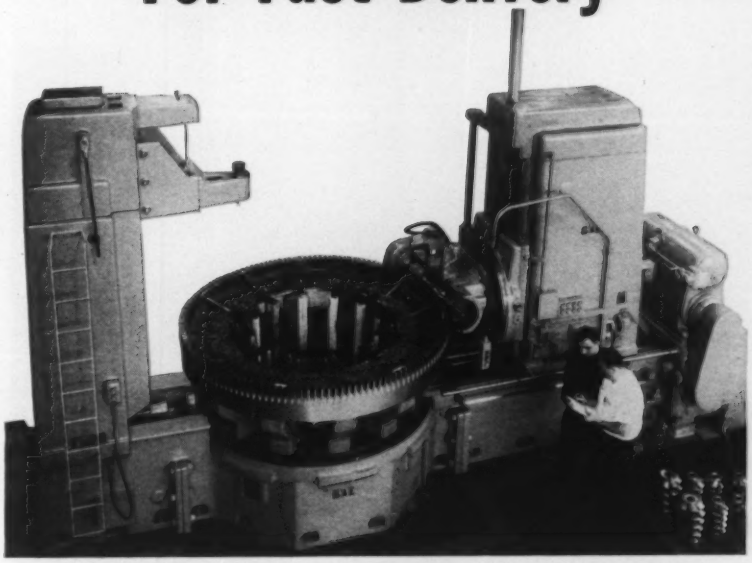
SLIP or cartridge type spindles are now offered on Zagar, multiple spindle, gearless heads for drilling, reaming, and tapping. The slip spindle drill is driven by the Zagar, gearless, spindle drive.

The spindle insertion plate is prebored to accept varying spindle patterns. The maker says it's simple to insert and remove spindles and the rigidity and accuracy of fixed center drilling are retained.

Absence of gears and joints per-



New Production Capacity For Fast Delivery



Large Generated Gears

SPUR • HERRINGBONE • HELICAL

for a wide range of industrial applications

Gears which must operate smoothly and without vibration at higher speeds and under greater loads must correspondingly be more accurate in tooth profile and spacing.

H & S Generated Gears answer these demands.

Offering the same high-quality standards which characterize the complete H & S Gear line, production capacities for large generated Spur, Helical and Hobbed-Herringbone Gears are now available in the following dimensions:

Up to 80″ outside diameter at 1 DP
Up to 90″ outside diameter at 1¼ DP
Up to 100″ outside diameter at 1½ DP
Up to 125″ outside diameter at 2 DP
Face widths up to 42″, depending on helix angle

Send your specifications, or let our technical staff make recommendations. H & S specializes in fast production of quality industrial Gearing and Speed Reducers to meet your custom requirements.

Write for Catalog FLB-60

The HORSBURGH & SCOTT CO.
5112 Hamilton Avenue • Cleveland 14, Ohio

ARCOS STAINLESS OVERLAY CUTS COST

Job Report Courtesy of Pottstown Metal Products Works
Cochrane Div. of Crane Co., Pottstown, Pa.

Arcos stainless overlay cuts overall cost of chemical reactor 10%. The application of a stainless overlay to the face of a carbon steel flange, not available in clad material and too expensive in solid stainless, resulted in a 10% overall saving in the construction costs of an unusual epoxy resin reactor. The overlay was applied by automatic submerged arc, using Arcos Type 308 bare wire and Arcosite C7 flux. This is another example of the economy and performance you get with Arcos stainless filler metal products.

ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

NEW PRODUCTS and equipment

mits over-all head height to be reduced. Four standard head sizes cover maximum bolt circle areas of 6½, 10½, 12½, and 15½ in. Spindle sizes are 1¼ and 1½ in. with a capacity up to 9/16 in. in steel. Standard heads are mountable on round or flange type quill machines.

For further information, *write* Zagar Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

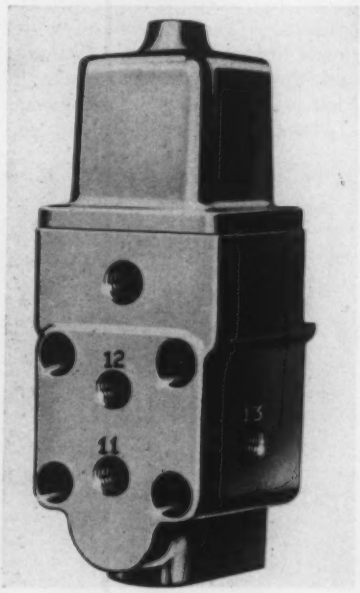
Solenoid Operated Pilot Valves Take 3000 psi

A LINE of solenoid operated fluid power pilot (directional) valves has ⅜ in. pipe taps and is suitable for pressures up to 3000 psi. Solenoid operation is direct. Springs return the plungers.

Other features include large flow areas (equivalent to ⅜ in. XH pipe size tubing), alloy iron bodies, precisely bored plunger holes, accurately machined port openings, alloy steel plungers, and multiple balance and lubricating grooves.

The solenoid is totally enclosed and sealed against moisture and contaminated atmospheres. A stem in the solenoid cover permits manual valve operation for setup and troubleshooting.

Bracket mounted pilot valves with



3/8 in. pipe tap ports and 3 3/8 in. mounting bolt circle are available with normally open and normally closed two and three way plungers. Over-all dimensions: 11 x 4 x 4 in. Net weight: 20 lb.

For further information, *write* Oilgear Co., 1571T W. Pierce St., Milwaukee 4, Wis.

Reflective Tape Shields Parts from Extreme Heat

A PRESSURE sensitive tape that reflects extreme heat from motors, wires, and such things as delicate structural parts has been introduced by 3M. The tape (Scotch Brand No. Y-9050) is capable of performing continuously at 500 to 600° F and can take more than 3000° F of radiant heat for short periods, the company adds.

The tape is easy to handle and can be spiral wrapped with no damage to heat reflection characteristics. It's thin and flexible and can be quickly and permanently adhered. The material readily conforms to irregular shapes and curved pipes.

The company says the tape is a lamination of 0.0005 in. aluminum foil to 0.002 in. glass cloth coated with a white silicone adhesive. It's available in widths from 1/4 to 36 in. and in roll lengths of 36 yd.

For further information, *write* Dept. J1-1, Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

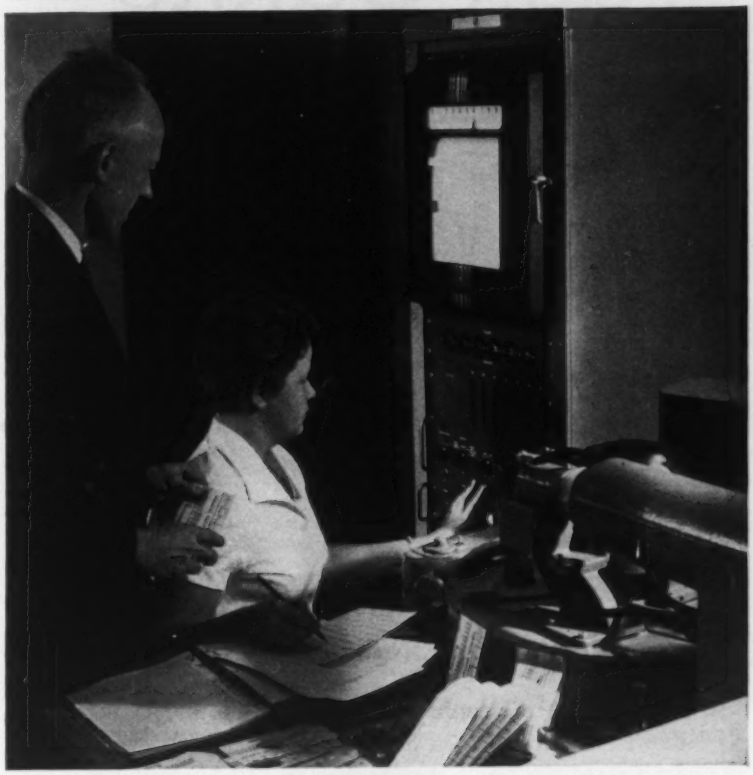
Spikewelders Designed For Tiny Electronic Parts

FOUR models of National's standard, spike, power bench welders have been designed for precision welding of transistors and minute electronic components.

Three models are available with standard welding controls. The models vary in transformer and firing tube capacity and in weld pressure delivered (from 2 to 500 lb).

Advantages of spikewelding, says the company, include low heat effect in the weld zone, reduced shunt effect, closer spot spacing (even on heavy material up to 14 gage), a columnar current pattern (permitting welding of multiple thick-

BETTER WELDING THROUGH ARCOS QUALITY CONTROL



X-ray Emission Spectrograph shows analysis of Arcos weld metal

Predictable performance of Arcos weld metal results from strict adherence to uncompromising standards. The program of rigid quality control of filler metal products enforced by Arcos is comprehensive and far-reaching. Every phase in production is subjected to constant inspection. Modern testing instruments provide highly accurate analysis of materials and weld metals. Rigid quality control assures predictable performance of Arcos filler metal products.

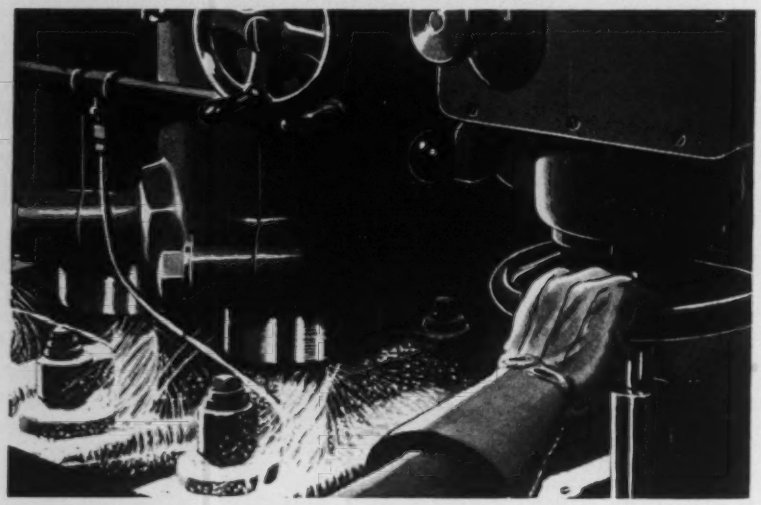
ARCOS

Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

For top economy in oil-water lubricants

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Oakite Formula 59 cutting solution fights rancidity . . . lasts longer

Most soluble oil cutting solutions are thrown out before they're worn out. When they turn so rancid that operators can't stand the smell, they're replaced. Understandable . . . and wasteful. But using Oakite 59 is far more economical. It *resists* rancidity, lasts far longer—especially in summer, helps protect workers from infection, cuts cost.

How well does it lubricate? Specially formulated from paraffin crude, it forms a stable, uniform emulsion in water for excellent lubrication, good cooling, corrosion protection for work and machine alike.

One of a line of Oakite lubricants for machining and forming, Oakite Formula 59 is a specialized material—as all Oakite products are. Ask the Oakite man about those designed for your operations, your products. And send for Bulletin A-9864. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

over 50 Est. 1909 SCIENCE

years' leadership in industrial cleaning

NEW PRODUCTS and equipment

nesses), and lower weld pressure requirements.

It's especially suitable for welding dissimilar metals and for materials such as titanium, zirconium, tantalum, Kovar, Dumet, tungsten, and nickel. Work range covered by the line extends from tiny tube elements and wire down to 0.001 in. diameter up to husky transistors.

For further information, *write* National Electric Welding Machines Co., 1846 Trumbull St., Bay City, Mich.

Accuracy Stressed on Jig Boring Machine

ELIMINATION of table overhang, addition of reference scales to the saddle and table movements, square edged sliding ways for accuracy, and upgraded accuracy of the lead screws are some of the features on the 1A jig boring machine.

It's designed to handle a wide variety of small die work, jig and fixture making, modelmaking, drilling, reaming, and precision boring. Locations can be easily and quickly set, says the maker. The sliding head is counterbalanced by connection to a weight of the correct size through a heavy roller chain run-

ning over sprockets. Flat working surfaces are hand scraped to high accuracy.

The spindle is double heat treated and ground. Bearings need no adjustment. For better concentricity, the quill is ground while on its own bearings.

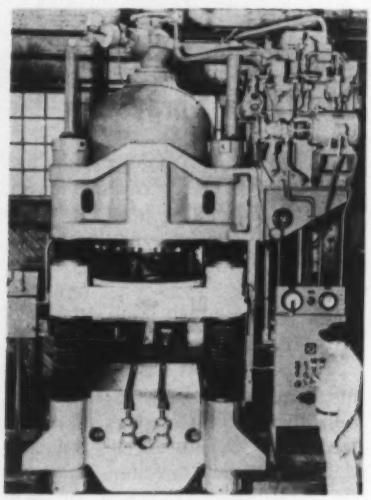
A direct reading micrometer depth gage helps to eliminate computational errors. Rapid tool changing and accuracy of operation are emphasized in the collet and toolholder. Fast setting and easy to release ribbon type locks are used. The company adds that the ribbon locks eliminate the possibility of movement when the table and saddle are being locked in position. Accessories are available.

For further information, *write* Linley Bros. Co., 682 State St. Extension, Bridgeport 1, Conn.

Grinding Wheel Press Rated at 1600 Tons

A TWO station, hydraulic, grinding wheel press made by Birdsboro can be operated at different pressing strokes, tonnages, and daylight openings at each station.

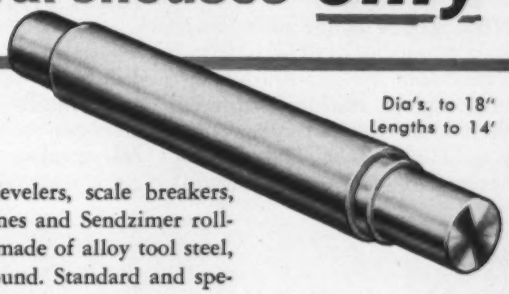
The 1600 ton press has a single action, down movement. It has four columns and is equipped with interlocking controls. The controls



permit independent operation of each station at tonnages varying from 1600 down to 200 tons.

Each operator has a setup button which locks out the other station, preventing the second operator from

For STEEL MILLS
and warehouses *only*



"HILL ACME" ROLLS

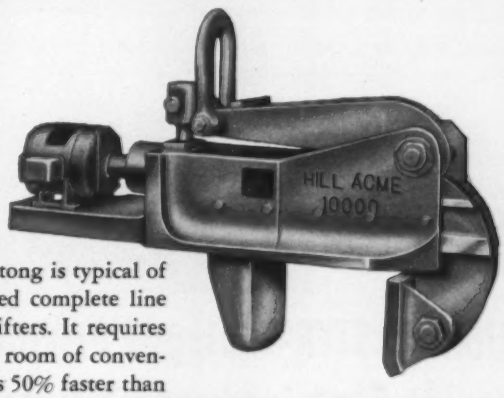
Dia's. to 18"
Lengths to 14'

Custom made for levelers, scale breakers, straightening machines and Sendzimer rolling mills. Precision made of alloy tool steel, heat treated and ground. Standard and special types.

"CLEVELAND" METAL CUTTING KNIVES

The product of forty years of experience in manufacturing alloy grade, metal cutting knives of all types for shearing hot and cold metals.

"HILL ACME" MOTORIZED LIFTERS



This vertical coil tong is typical of the newly designed complete line of HILL ACME lifters. It requires only 1/3 the head room of conventional tongs and is 50% faster than mechanical types. Gives a constant grip ratio regardless of wall thickness and can be prepositioned to eliminate damage to the coil. Available up to 80,000 lbs. capacity. Contact us for "C" hooks, Rack Lifters, Billet, Sheet, Plate, Bar, Ingot and Ingot Mould Lifters.

THE HILL ACME COMPANY

1201 West 65th Street • Cleveland 2, Ohio

MANUFACTURERS OF: "HILL" Grinding and Polishing Machines • "ACME" Forging Machines • "CANTON" Rotary and Alligator Shears • BAR-BILLET Shears MATERIAL HANDLING Equipment • "CLEVELAND" Knives and Shear Blades.

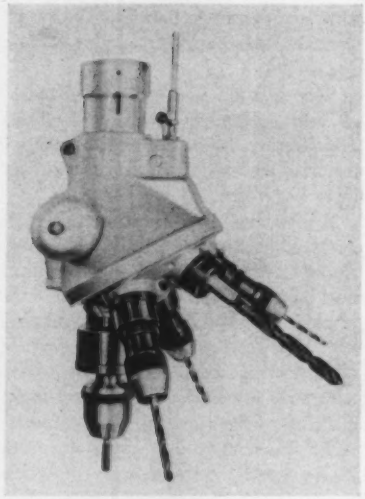
taking control of the press operation. An emergency return button at each station can stop the press and automatically return it to its open and top position.

Working area of the press is 41 x 41 in. Maximum daylight is 33 in. and maximum working stroke is 29 in. All exposed machined surfaces are protected by an accordion type, zippered closure boot. The press is self-contained with the hydraulic pumping unit mounted on top.

For further information, *write* Birdsboro Corp., Birdsboro, Pa.

Multispindle Drill Head Takes Five Tools at Once

AN AUTOMATIC, multispindle, drill head called the Arbo-3 that automatically revolves and indexes takes two to five tools at one time. All spindles are completely and quickly interchangeable. Eight independent speeds are available. All work spindles are provided with suitable Morse and Jacobs tapers and with suitable drilling and tapping chucks. Special tapers can be obtained.



Features: 1. Workpieces are completely machined with a single setup. 2. Fast speed changes are possible. 3. No reversing of drill spindle is necessary during the tapping operation. 4. The motor for automatic indexing is independent of the drill press motor. Capacities: Drilling—1/8 to 1 in.; tapping —1/8 to 15/16 in.

For further information, *write* Jersey Mfg. Co., 401 Livingston St., Elizabeth, N. J.

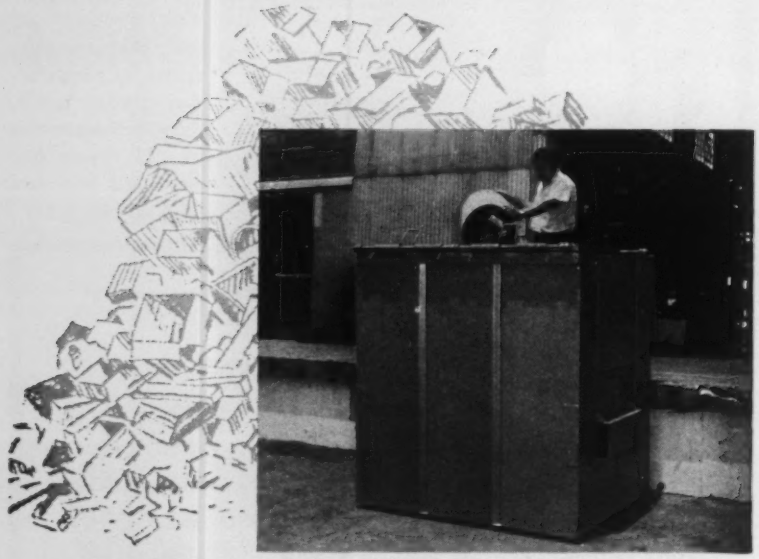
Attachment Widens Scope Of Plasma Spray Gun

AN ATTACHMENT for Plasmatron hand spray guns permits spraying of materials ranging from low melting point epoxies and powdered metals to refractory cermets, oxides, and carbides. Plasma jet temperatures between 350 and 30,000° F are possible, says Plasmadyne.

The attachment has a positioning mechanism for varying the insertion distance of the gun's rear electrode into the throat of the concentric, powder injection electrode. By adjusting the distance, arc temperature at the injection point may be closely controlled.

The high degree of temperature stability benefits spray operations involving highly complex coating compounds which are prone to

NOW! You Can End Refuse Storage Problems...WITHOUT Capital Outlay



DUMPMASTER-Equipped Private Haulers Provide Containers and Efficient Service

If you're plagued with trash piles, scattered refuse, fire hazards, and hit-or-miss collection, there's a good chance you can do something about it . . . WITHOUT CAPITAL OUTLAY!

In most major cities DEMPSTER-DUMPMASTER-equipped private haulers will put clean, big-capacity storage containers at convenient locations in your plant . . . empty them mechanically on schedule, or on a call-in basis . . . all for a reasonable monthly fee.

When you containerize your refuse, plant housekeeping becomes easy, employee morale goes up.

Write today for the name of your nearest private hauler. We'll also send literature describing his service.

PART OF THE DEMPSTER DUMPSTER SYSTEMS

Write Today for Free Brochure and Name of Nearest Private Hauler

DEMPSTER BROTHERS Inc.

Dept. S-71, KNOXVILLE 17, TENNESSEE

chemical breakdown beyond narrow temperature tolerances. The attachment makes possible the selection of any desired temperature by adjusting and locking the electrode positioning mechanism. The device will fit standard 25, 40, or 80 kw Plasmatron spray guns.

For further information, *write* Plasmadyne Corp., a subsidiary of Giannini Scientific Corp., 3839 S. Main St., Santa Ana, Calif.

Vacuum Degassing Unit Designed for Foundry Use

A VACUUM degassing unit for foundry operations accommodates crucibles up to a maximum of Size 150. It provides a simple and effective means of removing trapped gases from the molten metal before the casting is poured, says the company.

It's a package unit equipped with a cylindrical vacuum chamber with a quick closing and quick opening cover that swings horizontally on a pivoting job crane and a pumping system that is capable of evacuating the chamber to the desired vacuum in minimum time. The two elements are mounted on a common base plate which occupies less than 20 sq ft. The unit is pretested and shipped completely assembled. It requires no special foundation and can be installed in less than one day.

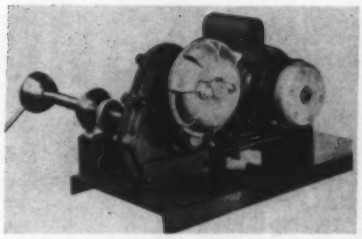
The chamber is easily removed from the base plate for fast cleanup of any spills. A conveniently located sight glass in the cover permits observation of the work and is easily cleaned and quickly replaced if it becomes damaged. An air filter is used to keep dirt and melt particles out of the vacuum pump.

For further information, *write* F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Units Provide Controlled Tension for Winding

A LINE of Reel-Wynders and winder drives provides controlled tension for winding materials such as foil, plastics, paper, textiles, wire, cable, film, filaments, metal tape tubing, laminations, and extrusions.

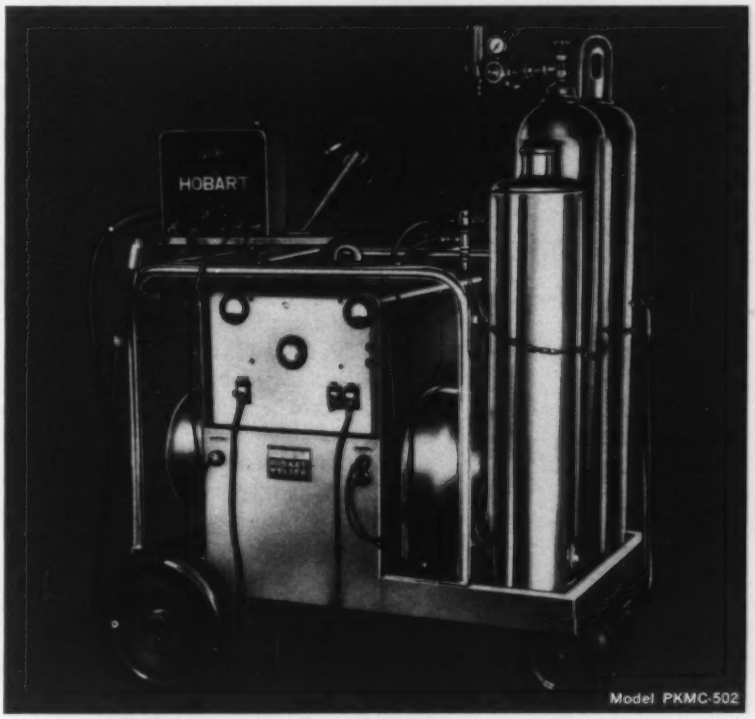
The manufacturer claims simplified construction provides cost savings of better than 50 per cent.



A fluid drive automatically delivers increasing torque and tapered tension over core ratios as high as 8 to 1, while process speeds may vary as high as 3 to 1. Two controls provide a wide range of adjustable tensions and speeds. Fine tension and speed adjustments can be made during operation. Large air cooling fins and high speed rotation help assure cool operation.

Output ratings: 1/16th through 3 hp. Five standard sizes provide winding speeds from 3.5 through 3500 rpm. Explosionproof equipment is available.

For further information, *write* Fluid Drive Engineering Co., 313 Hibbard Rd., Wilmette, Ill.



Model PKMC-502

Multi-wire the new welder
that handles all semi-automatic processes

Welds carbon steel, stainless, aluminum and many other nonferrous alloys with the proper selection of easily interchangeable components.

- MICRO-WIRE process for use with gas-shielded small diameter wire — all position.
- MIG-CO_2 for use with large diameter wire at high deposition rates, low cost CO_2 gas.
- FABCO process for high quality high deposition rates using low cost CO_2 gas and tubular wire.
- MIG-ARGON process (and other inert gases) for aluminum welding in all positions.
- SUBMERGED ARC for high deposition rates, high quality, on flat position work.
- OPEN ARC for hardsurfacing by using fabricated wire without shielding gases.

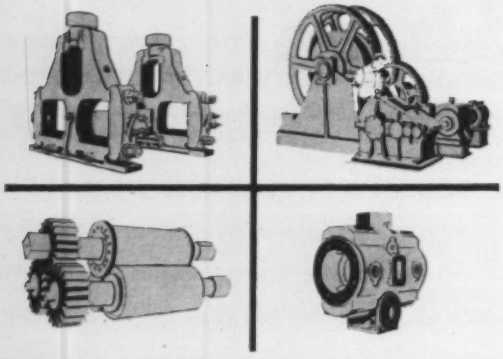
This welder is years ahead in concept and design and offers exceptional cost cutting advantages in **one complete package.** Write for details.

HOBART BROTHERS COMPANY, BOX ST-71, TROY, OHIO—Phone 513-332-1223
Manufacturers of the world's most complete line of arc welding equipment
International Sales, Hobart Brothers A.G., Box 5500, Nassau, Bahamas

SERVICE FOUNDRY

Chances are that you have us in mind as specialists in marine components and sugar machinery. It's a fact that our reputation was built on serving these fields, and we continue to do a large volume in them. What we would like to tell you is that we've expanded our facilities over the years to the point of extreme capability in electric furnace steel castings of medium and high carbon content, semi-steels in our iron foundry, and aluminum, monel and the various alloys of brass and bronze in our non-ferrous foundry. Our machine shop is equipped with some of the largest and most diversified tools in the South—rounding out our complete foundry facilities.

Service Foundry would like to work for you. Your inquiry will bring a prompt, definite reply.



SERVICE FOUNDRY

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a division of AVONDALE SHIPYARDS, INC.

NEW literature

Write directly to the company for a copy

Stainless Steels

A discussion of precipitation hardening, heat treatment, mechanical properties, and fabrication of stainless steel is included in a 32 page booklet. Ask for Form Adv. 1223. Advertising Div., Republic Steel Corp., 1441 Republic Bldg., Cleveland 1, Ohio.

Bolt Failure Analysis

An analysis of aerospace bolt failures is presented in a 16 page study. Data on ten failures occurring in flight, on the test stand, or in preliminary quality control testing are included. Each case consists of a generalized description of the application, details of the failure, and reasons. Photos show type of bolting and metallurgical nature of failure. Request Emergency Report No. 495. Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Fastener Efficiency

Methods of increasing threaded fastener efficiency are discussed in a four page folder. The relationship between applied torque and resultant clamping force in fasteners is discussed. Why torque readings in themselves are not reliable measures of fastener holding power is explained. Skidmore-Wilhelm Mfg. Co., 442 S. Green Rd., Cleveland 21, Ohio.

Gasket Materials

A 24 page bulletin discusses the selection of gasket materials and gasket design. The resistance rating of 120 fluids and gases is detailed. Garlock Inc., Palmyra, N. Y.

Machining of Aluminum

A brochure covers speeds used for machining aluminum on screw machines, alloys with best machinability, recommended coolant-lubricants, and information on tool materials and angles. Dept. PRF-49, Reynolds Metals Co., Richmond, Va.

Bearing Lubrication

Modifications of the grease guide recommended by the Anti-Friction Bearing Manufacturers Association are included in a folder. Aetna Ball & Roller Bearing Co., a division of Parkersburg-Aetna Corp., 4600 Schubert Ave., Chicago 39, Ill.

Diamond Grit Performance

Volume 2, No. 1 of *Diamond Data* discusses the performance of new types and shapes of diamond grit in grinding operations. The company expects that further information on the relationship between operation variables and grit performance will make possible greater diamond wheel efficiency. Succeeding issues will discuss other aspects of grinding wheel evaluation. Industrial Diamond Div., Engelhard Hanovia Inc., 113 Astor St., Newark 2, N. J.

NOW . . . A ONE-COAT FINISH FOR EXTERIOR ELECTRICAL CLOSURES

Cut paint/bake time in half with new SUPER NUBELITE® thermosetting acrylic finish

June 27, 1961—The Glidden Company announces a new one-coat finish for electrical enclosures with the weather-resisting properties of traditional two-coat systems.

This newest in the family of Glidden one-coat SUPER NUBELITE finishes has just passed the stringent tests of a leading independent testing institution and is approved for suitable exterior electrical applications.

The battery of tests included salt spray, ultra-violet light and water, moist carbon dioxide-sulphur dioxide and moist hydrogen sulphide—all proving the durability of SUPER NUBELITE.

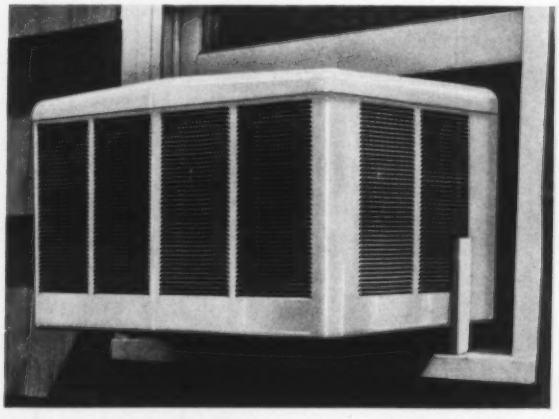
SUPER NUBELITE is applied in a film thickness of 1.5 mils and can attain theoretical coverage of 700 square feet per gallon per mil.

Other one-coat SUPER NUBELITE finishes are already in production on refrigerators, freezers and fluorescent light fixtures. Two-coat SUPER NUBELITE is now being used on clothes washers, dryers and other electrical appliances.

For complete information on one-coat SUPER NUBELITE finishes, call your Glidden representative or write direct.

Key to approval by leading independent testing institution was salt spray test. Above panel, coated with one-coat SUPER NUBELITE shows creepage of less than 1/16 inch along scribes after 2208 hours exposure.

Air conditioners and other exterior electrical enclosures can be finished with SUPER NUBELITE for superior weather protection at one-coat economy.



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THE GLIDDEN COMPANY

INDUSTRIAL PAINT DIVISION

900 Union Commerce Building

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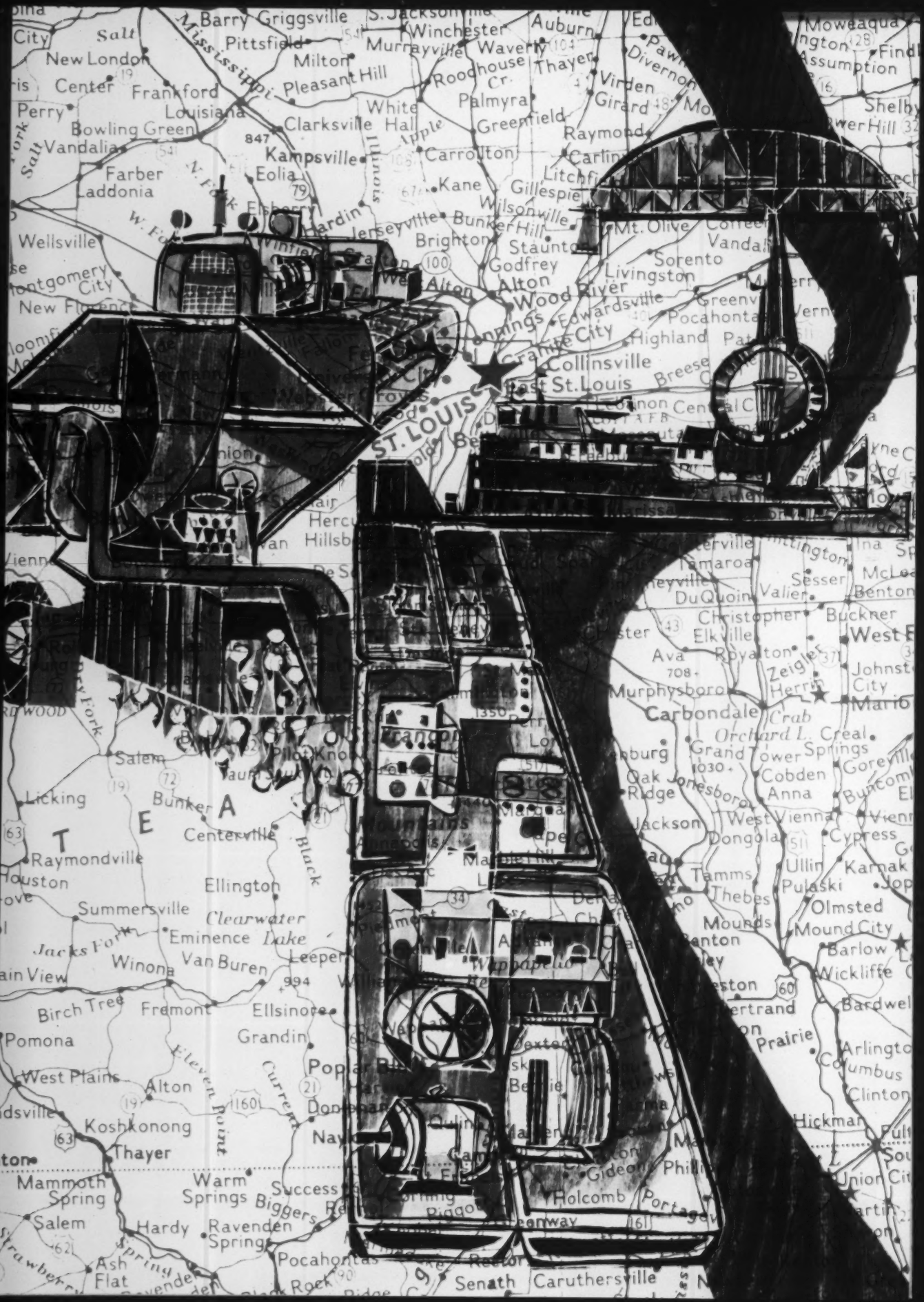
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Centralia
Salem
Pilot Knob
Licking
Bunker
Centerville
Raymondville
Houston
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Summersville
Eminence
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Van Buren
Leeper
Fremont
Ellsinore
Birch Tree
Pomona
Grandin
West Plains
Alton
Koshkonong
Thayer
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Salem
Hardy
Ravenden Springs
Warm Springs
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Pocahontas
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Clinton
Hickman
Union City
Black
Current
Eleven Point
Strawberry
Spring
Wappapello
Dexter
Portage
Penway
Piggott
Rector
Ridge
Rock
Marissa
Breese
Mascoutah
Belleville
Fairview Heights
Lebanon
Central City
Mississippi
Illinois
Kaskaskia
Big Muddy
Salt
W. Fork
E. Fork
Jacks Fork
Current
Eleven Point
Strawberry
Spring
Black
T E A
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67 years of service to the Industrial Middle West

INLAND STEEL IS HERE

And here, is where each year the Veiled Prophet comes up from the waters of the Mississippi with his Merry Krewe. Here, too, is the home of the St. Louis Blues and of Joseph Pulitzer and of Mark Twain and of Dr. Beaumont of medical fame. And of Grant's cabin and of Eugene Field beloved of children the wide world over.

Nor is this the whole story of this rich territory which takes in half of Missouri, the northeast corner of Arkansas, the western edges of Tennessee and Kentucky, the southwest corner of Indiana and the southern half of Illinois.

For here are the riches of the earth . . . coal in Illinois; lead, zinc and iron in Missouri. Limestone and oil abound, and in the "Bootheel" of Missouri, cotton is king. From this varied land come electric motors, transformers, automotive brakes, stoves, home refrigerators, washing machines, airplanes, farm and road building equipment, wheels, galvanized products, commercial refrigerated display cases, building structures and giant bridges to span the nation's greatest rivers, and the world renowned products of famous brewmasters.

In the cities of this territory, vast areas are constantly uprooted to make way for the new. In St. Louis, itself, the Gateway to the Middlewest, an exciting project is turning the entire riverfront into a great parkland with a gigantic arch to symbolize a welcome to the world.

No wonder Inland is *here*. For as early as 1907, Inland saw this as a land of unlimited opportunity—established its District Office in the city of St. Louis. And since that day—more than half a century ago, Inland has enjoyed the friendly people of this land, shared in their triumphs and accomplishments, served its industries to the best of its ability.

From the Mississippi to the lovely Ozarks, from the wide Missouri to the land of cotton, Inland men are known and welcomed wherever they may go. For over the years, Inland has established a reputation based upon a keen interest in the men and the enterprise of this territory—a reputation built upon good will, dependability, and a genuine desire to be of service.

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Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis Kansas City • Milwaukee • New York • St. Louis • St. Paul

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**Division*

INLAND

One of a series depicting market areas served by Inland · Art by George Suyeoka

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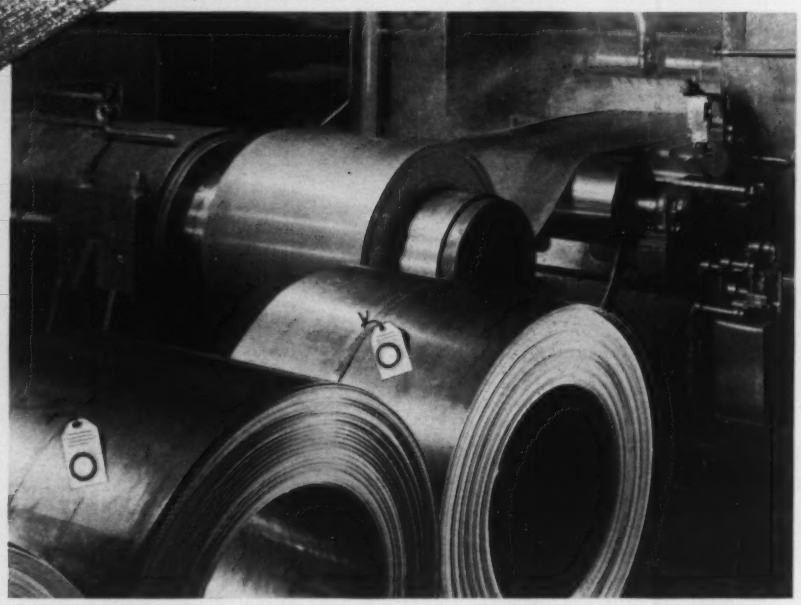
...GIVES BIG THRUST TO ORDERS AT

Acme-Newport Steel



Tell us you need steel in a hurry, and we stamp a big red circle on your order and immediately put it into orbit around this mill. When you're caught with your inventories down, Acme-Newport goes all out with an unusual combination of modern facilities, convenient central location and flexibility of operation and scheduling, to ensure your getting what you want when you want it. *Red Circle Service* safeguards quality at every step, too, while filling gaps in your inventory before they become critical. Give us a call and we'll prove it!

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Hot Rolled Steel in Coil	Cold Rolled Steel in Coil (*full hard only*)	Plates (3/16" *and lighter*)
Hot Rolled Pickled Steel in Coil	Cold Rolled Sheets	Electrical Sheets
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Sidewise Movement Persists

ALTHOUGH steel output is trending upward in the wake of July 4th curtailments, demand is leveling off.

That's no surprise to most steelmakers. They expected seasonal setbacks and predicted that ingot production in July would be 7.7 million to 8 million tons (vs. 8.5 million in June). So far, their forecasts are right on the beam. But they're beginning to wonder about prospects for August.

GLOOM IN MIDWEST— Sales executives at Chicago area mills see no August upturn. Automakers aren't ordering as much tonnage for August delivery as anticipated. Demand for cold rolled sheets has weakened noticeably, leading one producer to predict that its August shipments will be 2 to 3 per cent below July's. The possibility that last minute orders will make up the deficit isn't ruled out, but it's considered unlikely. The gloom is tempered only by confidence that anything not delivered to automakers in August will be shipped in September, pushing that month above original forecasts.

OPTIMISM IN EAST—In other steelmaking centers, sales officials are happier about the August outlook. Leading producers in Cleveland, Pittsburgh, and the East expect to ship as much steel next month as they did in June. They look for a pickup in automotive demand and believe other customers may start building inventories in anticipation of higher prices.

TUBULAR GOODS FALTER— In oil country goods, inventories have already been increased. The stockpiling started about six weeks ago when producers offered independent distributors an extra discount of 4 per cent as an inducement to increase their inventories. That's not the way it worked out. Instead of building their own stocks, the distributors tried to boost their sales by giving part or all of the discount to customers. Result: Major oil companies stocked up at prices 4 per cent lower than they could have had on direct shipments from the mills. Some tubemakers saw their June shipments to distributors jump as much as 25 per cent, but the gains were apparently made at the expense of future business. July shipments may drop more than June shipments rose.

SIGNS OF STRENGTH— Regardless of what happens in July and August, it's clear that steel demand will be much stronger in the fall. Optimists note that: 1. Factory shipments of household appliances in May were up substantially from year earlier levels. June sales were even higher. 2. May orders for industrial material handling equipment were up sharply from those of April. 3. Late June sales of new cars were the highest of any ten day period in the last 12 months; dealer inventories dropped to 911,000 cars July 1 (vs. 1,060,000 a year ago).

STAINLESS PRICES UNSETTLED— As STEEL went to press, stainless steel consumers were betting that the July 5 price increases announced by one major producer wouldn't stick. Other producers hadn't upped their prices; some had reportedly informed customers that they would absorb the recent price hike in nickel.

PRODUCTION CLIMBS— Look for ingot production in the week ending July 22 to be slightly higher than the 1,850,000 tons that STEEL estimates the industry poured in the week ended July 15.

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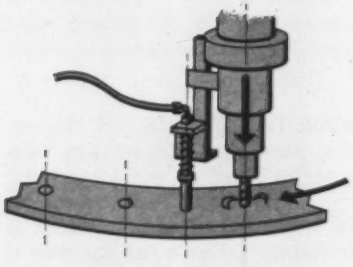
How 1 pneumatic recorder at GE led to 14 more

The first one did such a good job that General Electric's Evendale, Ohio, plant bought an additional 14 Sheffield pneumatic recorders, for application to automatic indexing jig borers.

An adjustable bracket on the quill holds a floating air spindle. After each hole is bored, the spindle enters the hole, automatically records the bore size. If the hole is within limits, the next hole is bored. If the diameter is not within specifications, the operator is warned by both lights and a buzzer.

The Sheffield Pneumatic Recorders proved so reliable that dimensions recorded at the machine have—in many cases—eliminated the need for subsequent inspections.

Write for Bulletin PREC.-212.



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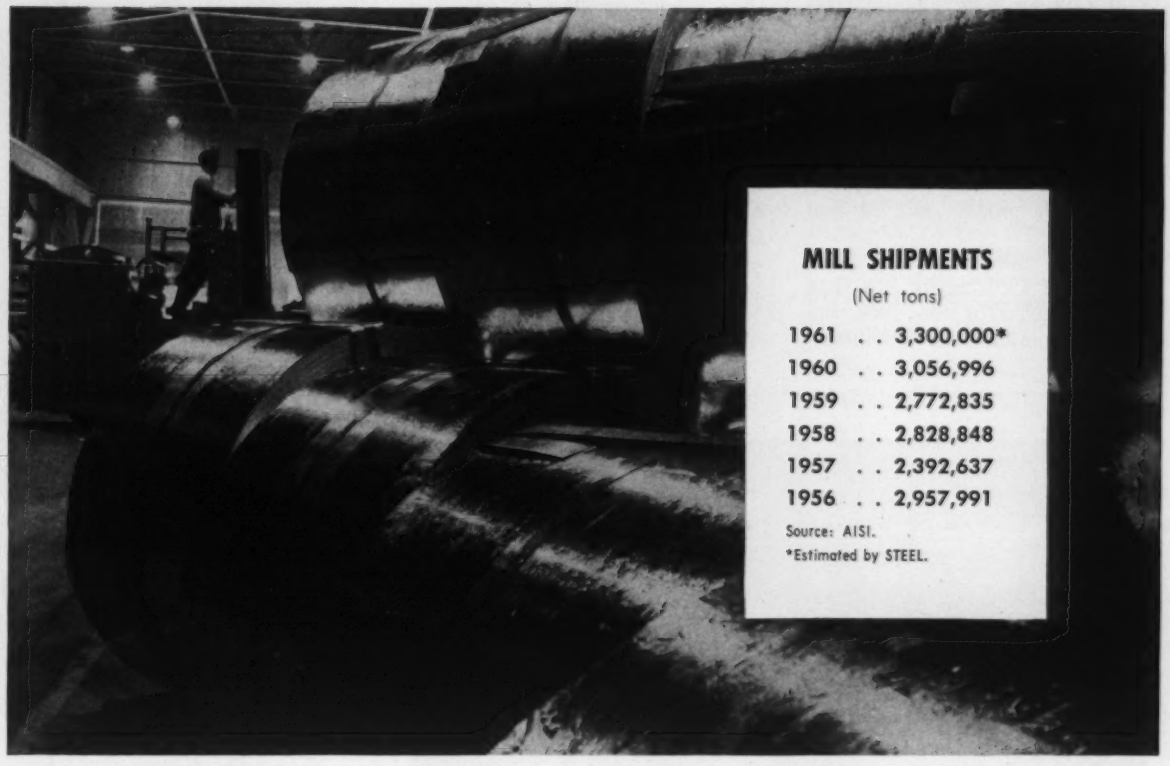

MILL SHIPMENTS

(Net tons)

1961	3,300,000*
1960	3,056,996
1959	2,772,835
1958	2,828,848
1957	2,392,637
1956	2,957,991

Source: AISI.
*Estimated by STEEL.

Galvanized Heads for New Record

SHIPMENTS of galvanized steel sheets will set a new record this year as markets are widened by new developments in coating, welding, painting, and the availability of wider stock.

LOOK FOR automakers to switch from differentially coated to the new, minimum spangle sheets for rocker panels. (Improved welding methods have already resulted in an increase for galvanized in unitized bodies.)

LOOK FOR big gains for galvanized in appliances and construction.

LOOK FOR new markets to open up as output of wider sheets is stepped up.

Last year's shipments of 3,056,996 tons were the biggest ever, but this year's will be even larger (see table). They'll set a record even if total shipments of all steel products don't exceed last year's 71 million tons. Reason: Zinc coated sheets are being used in more places than ever before as fabricators learn how to weld and paint them—overcoming the twin bugaboos that have limited their use in the past.

• **Slow Start**—Shipments through April (only 904,119 tons vs. 1,237,634 tons in the first four months of 1960) don't support the claim that galvanized sheets are headed for a record, but producers figure there's plenty of time to catch up and pull ahead. They point out that buying in the early part of 1960 was abnormal because of the poststrike pentup demand. The interesting thing about galvanized shipments this year is that they're averaging 4.8 per cent of total product shipments vs. only 4.3 per cent in 1960. If they maintain their current percentage, they're bound to set a tonnage record.

This year, as usual, the biggest market for galvanized sheets is contractors' products. Thirty-six per cent of the first quarter's shipments went into such items as culverts and concrete pipe, equipment for air conditioning, ventilating, plumbing, and central heating, raingoods, roofing, siding, and architectural products. Service centers and distributors took 30.8 per cent of the output. The automotive industry took 7.3 per cent; appliances, utensils, and cutlery, 6.3 per cent; and agricultural equipment, 5.6. Smaller users took the rest.

• **Automakers Show Way**—First quarter shipments to the automotive industry were less than those of first quarter, 1960 (47,369 tons

vs. 57,472) but more important percentagewise. Automakers upped their share of the industry's output from 4.2 to 7.3 per cent. Improved welding methods enabled them to specify more galvanized for the 1961 models with unitized bodies (mostly compacts) and they continually shifted their product mix in that direction.

Although they're building fewer cars in the 1961 model run than they assembled in the 1960 run (about 5.5 million vs. 6 million), they're building more of the types that use a large amount of zinc coated steel. Thirty-five per cent of the 1961s will be compacts (vs. 25 per cent of the 1960s), so unit production will jump from 1.5 million to 1.9 million. What's more, most of the 1960 cars that used some galvanized steel used more of it in 1961. Ford's Falcon, for example, went from 100 lb per body to 125 lb.

Biggest galvanized user in Ford Motor Co.'s stable—and biggest in the industry—is Lincoln Continental (250 lb). Thunderbird has 213 lb; Comet, 135 lb; Econoline trucks, 92 lb; and standard Fords and Mercurys, 20 lb (rocker panels only).

● **Consumption Rising**—Last year, the automotive industry took 218,964 tons of galvanized sheets, 55.5 lb for every car and truck it produced. (In 1955, it used only 87,408 tons, or 19 lb per unit.) Ford Motor Co. bought 58,000 tons last year and estimates that it will need 80,000 tons in 1961. Fisher Body Div., General Motors Corp., is buying galvanized in 24 in. and 48 in. widths for structural members of its unitized cars—Chevrolet Corvair, Pontiac Tempest, Oldsmobile F-85, and Buick Special—and for the inner shell of Corvair's engine compartment lid. Industry sources believe that 1962 models of the larger GM cars will use galvanized for rocker panels and a few underbody components.

Chrysler Corp. has used relatively little zinc coated steel because of its emphasis on body dipping, but it can be expected to use more on its 1962 models. American Motors Corp., like Chrysler, relies mainly on body dipping for corrosion protection but uses galvanized for rocker panels. Studebaker-Packard Corp. uses relatively little galvanized but may use more for rocker panels on its 1962 models.

● **Welding Problems Yield**—Before automakers could start using galvanized sheets in volume, they had to overcome a welding problem: Zinc pickup on electrode tips caused early deterioration of weld quality and necessitated frequent stops for cleaning. The breakthrough came in 1959, when Weirton Steel Div. of National Steel Corp. offered Ford some galvanized sheets that had a thinner coat of zinc on one side than on the other. By exposing the "thin" side to the welding tips, Ford got less pickup and met its standard of 2000 welds between tip dressings.

Next, the company had to conquer problems of inadequate paint adhesion and blistering. They were solved by specifying extra smooth finish (temper passing) and by special surface preparation before painting.

● **Enter Minimum Spangle** — Al-

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though there was much enthusiasm for differentially coated galvanized steel—it went into initial Falcon production in the fall of 1959—the product had drawbacks: 1. It had to be specially marked ($5 a ton extra) so that users could tell the "thin" side. 2. It sacrificed part of its corrosion resistance. 3. It could be obtained from only a few mills. Not surprisingly, automakers redoubled their efforts to penetrate the welding barrier on equally coated commercial sheets. Their research paid off. Ford switched to regular galvanized on its 1961 cars, retaining differentially coated stock only in the rocker panels of standard size Fords and Mercurys. Continued efforts to perfect paint finishes led to the steel industry's introduction of minimum spangle (or spangle free) sheets. They're made by a fairly simple process: Strip emerging from the pot is blasted by steam lines. The $3-a-ton extra looks pretty good to automakers who have been paying an extra of $5 a ton for the marking of differentially coated stock. Chances are that minimum spangle will supplant differentially coated in rocker panels.

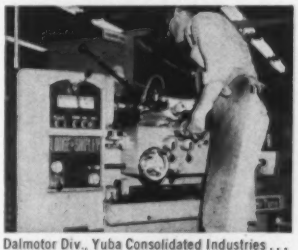
Equally important, the advances in welding and painting foreshadow big gains for galvanized sheets in appliances and construction. Prepainted sheets are a natural for the building industry. They're also catching on with makers of toys, playground equipment, and mobile homes.

• **Capacity Rising**—To meet the growing demand, steelmakers are expanding their galvanizing facilities. On May 1, 34 continuous lines with combined annual capacity of about 4 million tons were operating. In addition, there were 21 pots (580,000 tons), four electrogalvanizing lines (300,000 tons), and 300,000 tons of strip capacity. Total: 5,180,000 tons.

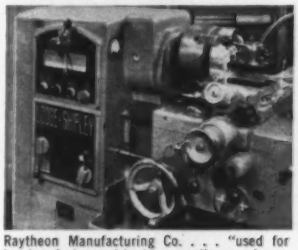
New, continuous lines have begun operating this year at Armco Steel Corp., Middletown, Ohio (maximum width 72 in., 200,000 tons a year), National Steel Corp.'s Midwest Steel Div., Porter County, Ind. (48 in., 120,000 tons), Inland Steel Co., Chicago (60 in., 120,000 tons), and Youngstown Sheet & Tube Co.'s Indiana Harbor, Ind., plant (60 in., 132,000 tons). Youngstown is re-entering the market after an absence of 20 years. By the end of the year, Republic Steel Corp. will open a new line at Warren, Ohio (48 in., 198,000 tons), and Granite City Steel Co. will bring a second line in at Granite City, Ill. (48 in., 120,000 tons).

During 1962, there will be new lines at Bethlehem Steel Co.'s Lackawanna, N. Y., plant (72 in., 200,000 tons), U. S. Steel Corp.'s Gary (Ind.) Works (60 in., 200,000 tons), and National Steel Corp.'s Midwest Steel Div. (48 in., 120,000 tons). At the end of 1962, total U. S. capacity to coat sheet and strip by all methods will be about 6,138,000 tons. Breakdown: One 30 in. line, four 36s, two 42s, twenty-five 48s, two 54s, four 60s, and two 72s.

The trend toward wider lines reflects two things—steelmakers' interest in getting more tonnage per hour and their desire to crack markets that may eventually require wider sheets.



Dalmotor Div., Yuba Consolidated Industries . . . "used in model shop for turning, facing and boring all sorts of experimental parts."



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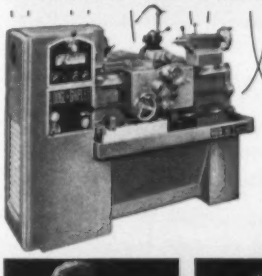

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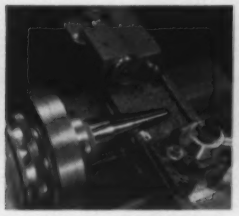

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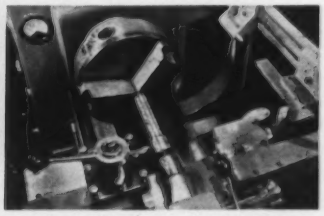


Indiana Gear Works . . . has earned a reputation of "excellent for high production."

Price Trend Is Mixed on Imported Steel Products

Prices on imported steel from Western Europe are mixed, but the over-all market reflects strength. Prices on nails are up $4 a ton, while structurals are up $2, deformed bars and I-beams $1. Prices on barbed wire are also higher.

Items on which prices are lower include merchant bars, off $4 a ton, and plates, down $2. Prices are unchanged on bar size angles, furring channels, hot bands, and wire rods.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 164 & 165

June shipments of sheets and strip were almost as heavy as May's when they reached a first half peak. July deliveries will probably be off about 8 per cent from June's due to vacations throughout the metalworking industry and model changeovers in the automotive industry.

All of the auto steel shipped since late last month probably will go into 1962 model cars. Steelmakers think auto steel shipments will rebound next month to the May-June level.

Chicago area sheetmen are less optimistic than those at Pittsburgh. They think demand next month may fall 2 to 3 per cent under that in July. They cite slow buying for August delivery on automotive account. However, they anticipate a sharp pickup in ordering in September.

Interest in the trend of prices is rising. So far, however, nothing in the way of hedge buying against a possible increase has developed. There's no current evidence of any price weakness. However, there has been some price cutting on sheets within the last three months, particularly on cold rolled. A Detroit area seller is reported to have sold limited tonnages in the Chicago market at $8 to $10 a ton under published prices. Bargain tonnages are no longer available, it's said.

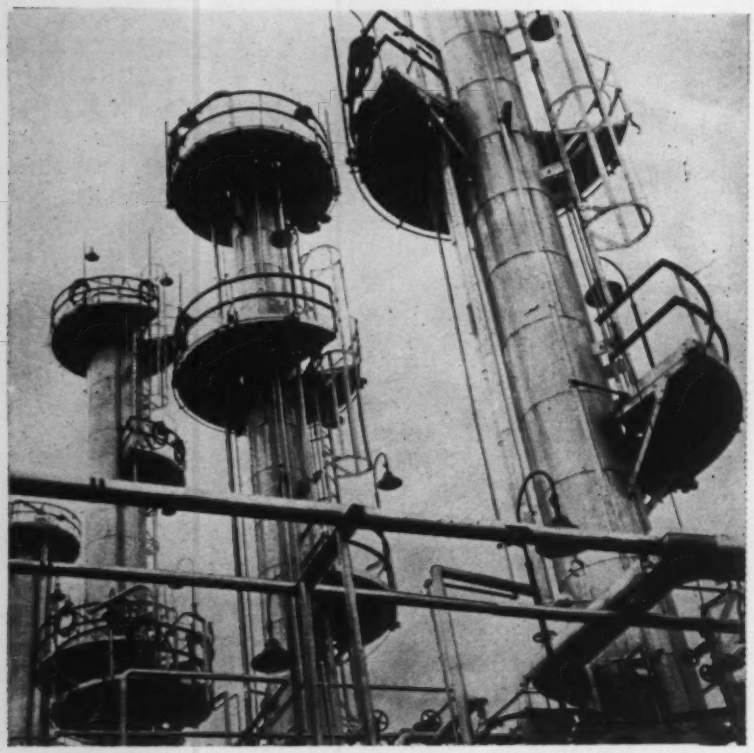
Plates . . .

Plate Prices, Page 163

Current demand for plates is light and spotty, but July orders have been a shade better than had been expected. That's due primarily to a better movement of plate specialties. Some shops are estimating slightly heavier tonnage for the fourth quarter. The Coast Guard closes Aug. 15 on three, 210 ft patrol vessels.

Prompt mill shipments tend to hold back forward buying though steel inventories of fabricators are low.

Extras on plates in widths of 12, 24, 36, 48, 60, and 80 in. have been revised so they now apply to intermediate sizes on an "exclusive" basis. Previously, the upper limit of each size range was "inclusive." For example: Plates "over 36 in. to 48 in. inclusive" carried an extra of $1.55 per 100 lb. Since plates over 48 in. to 60 in. inclusive had a lower extra—$1.40—buyers were accustomed to specifying a slightly larger size than 48 in., say 48 1/16, to get the lower price. Under the revised setup, the extra for 48 in. is $1.40, and extras for the other sizes (12, 24, 36, 60, and 80 in.) also fall into the next brackets.



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Tool Steel . . .

Shipments of tool steels (excluding hollow drill steel) in May totaled 6305 net tons, reports the American Iron & Steel Institute. Comparative figures: 5987 tons in April, 1961; 7610 tons in May, 1960.

The total movement in the first five months of this year was 30,720 tons, off sharply from the 45,917 tons moved in the same period of 1960.

Steel Bars . . .

Bar Prices, Page 163

Demand for hot rolled carbon steel bars appears to be holding up better than that for sheets. Even some automotive buying is reported, but chief support is coming from miscellaneous consumers. Less vacation downtime at some manufacturing plants is noted. Also, the service centers are specifying a little more freely than they were.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 164

Public work, including road construction and schools, is taking substantial tonnages of reinforcing bars. Competition continues keen, particularly at those points where imports play a big role in setting the market pace.

Connors Steel Div., Birmingham, H. K. Porter Company Inc., has opened a reinforcing bar fabricating plant in New Orleans. It will process bars provided by the company's Birmingham mill.

Tin Plate . . .

Tin Plate Prices, Page 165

Canmakers are not taking deliveries on all of the tin plate the mills have earmarked for them. The reason: Sluggish consumption of beer and soft drink cans, because of the cool weather. Requirements for food pack cans have also been held down very noticeably by the weather.

Tubular Goods . . .

Tubular Goods Prices, Page 167

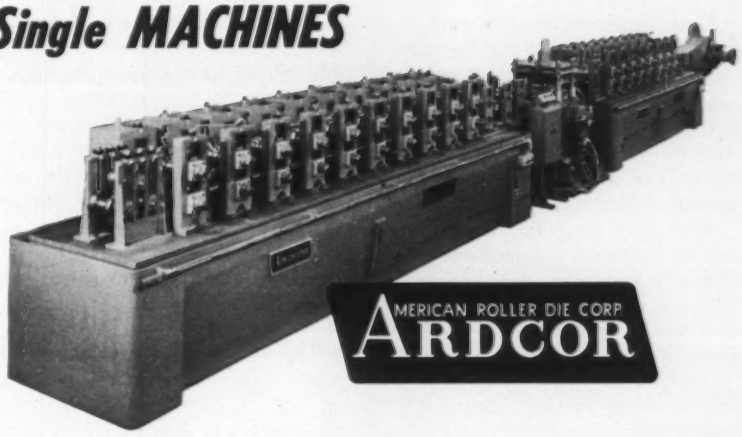
The number of rotary oil drilling rigs in operation in the U. S. and Canada reached a high for the last 12 months with 1987, the latest weekly survey by Hughes Tool Co. shows. The U. S. had 1816 rigs operating, up 43 for the week, while Canada had 171, up three.

Shipments of oil country goods in June were up about 15 per cent from the previous month's, and sales are continuing at a good pace. Users are ordering farther ahead.

The upturn reflects depletion of consumer inventories and distributor efforts to cash in on a special discount of 4 per cent granted six weeks ago by the producers. Its purpose: To stimulate stocking by independent distributors and enable them to more effectively compete with captive distributors.

If 46,079 oil wells are to be drilled

Automated PRODUCTION LINES or Single MACHINES



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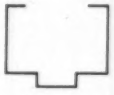
For complete automation on some sections and to eliminate costly secondary operations two ARDCOR Roll Forming Machines may be used with an ARDCOR Cut-Off Press between the two.

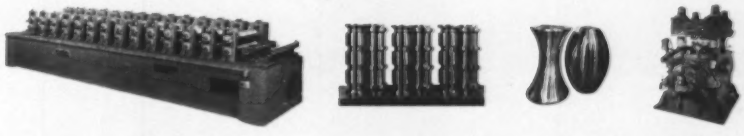


Or, a single Roll Forming Machine may be the answer to your cost-reducing program.

Let ARDCOR review your requirements . . .

***American* ROLLER DIE CORP.**

29520 Clayton Avenue **Wickliffe, Ohio**



AMERICAN ROLLER DIE CORP. ARDCOR

Single Roll Forming Machines • Complete Automated Roll Forming Production Lines • Lock Seam and Electric Weld Tube Mills for Ferrous and Non-Ferrous Metals • Cut-Off, Pre-Notch Presses • Slitters • Straightening, Pinch, Leveller Rolls • Pipe Rolls, Tube Rolls, Forming Rolls

this year, as has been predicted, second half shipments of oil country goods may be 15 per cent higher than those in first half.

Pig Iron . . .

Pig Iron Prices, Page 168

Merchant iron business is spotty. Many foundries are closed for vacations; others are operating below capacity and are buying iron only for immediate needs.

The shipment of Buffalo area pig iron by lake and ocean vessels is fairly active. Export trade is brisk, tonnages going to Japan and Western Europe.

Distributors . . .

Most big users of steel have cut back on their buying for the summer. Some plants are closed for vacations and auto model changeovers, and will not be consuming steel for several weeks. Steel service centers believe July will likely be the slowest month of the year.

There appears to be little concern among buyers over a possible price rise later this year, and there is no evidence that consumers are buying as a hedge against such a development.

The price situation is unstable in several major districts. Seven firms put in bids recently for steel for a truck body order in an Alabama city. Seven different prices were quoted. "There is no such thing as a published price on hot rolled steel products on the warehouse level here," says a distributor in Birmingham.

Steelmaking Recovering From Holiday Week Dip

STEEL INGOT demand warranted only a partial recovery in operations last week from the low level reached in the holiday week.

STEEL estimates output for the week ended July 15 at 1,850,000 tons, an increase of about 4 per cent. In the July 1 week, output was 1,925,000 tons.

Producers report an improving flow of orders for most items, indicating an increase in operations in August.

● **Youngstown**—The operating rate rose to 52 per cent in the week ended July 15 from 45 per cent the preceding week. Steelmakers say the volume of incoming orders is not as large as they would like, but add the outlook is for improvement later in the summer.

● **Buffalo** — Ingot operations hold fairly steady at about 44 per cent of 1960 capacity. The current pace of orders has leveled off at a reduced rate for the summer and not much change is anticipated by the steelmakers until late August.

● **Birmingham** — The steelmaking rate here rose to 75 per cent of 1960 capacity in the week ended July 15. Demand for finished steel has improved and furnace operations are being geared to meet the anticipated pickup during the rest of the year.

● **Philadelphia**—A rebound in steel production in the Northeastern district is indicated for the week ended July 15.

● **Chicago**—Slower demand for steel this month dropped operations for the week ended July 15 by 2 points to 74 per cent of 1960 capacity.

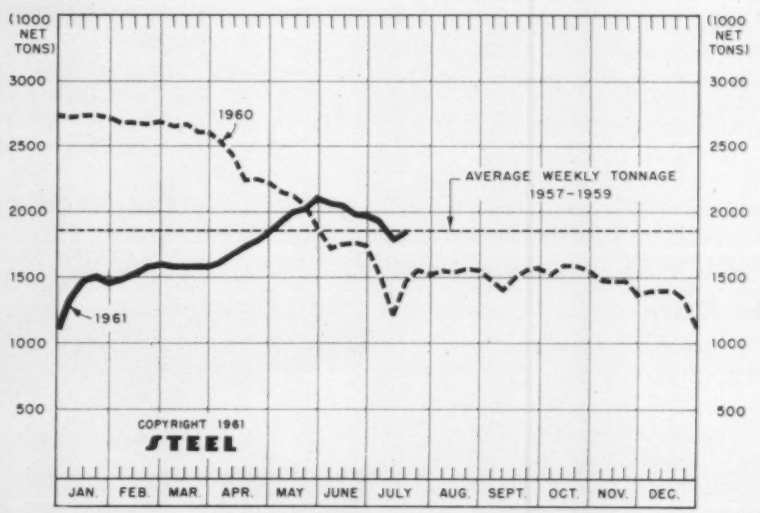
● **Cleveland** — Production of steel ingots rose above the 100,000 ton level during the week ended July 15 following a drop to 98,151 tons for the preceding holiday week. That was the smallest tonnage produced since the week ended Apr. 29.

STEEL INGOT PRODUCTION

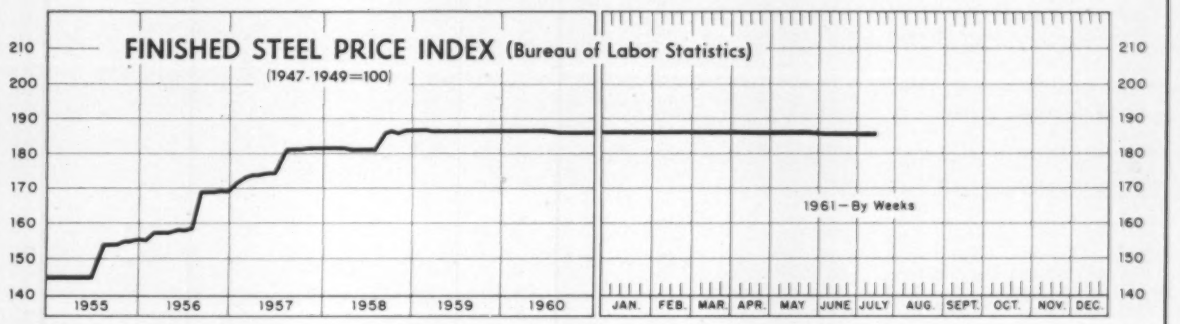
Weeks Ended	Net Tons	Change
July 15	1,850,000*	+ 4.0%
July 8	1,779,000	— 7.6%
July 1	1,925,000	— 2.7%
Totals to July 8		
1961	46,850,000	—23.9%
1960	61,589,000	

DISTRICTS	Week Ended July 8 Tons‡	Week Ended July 8 Index†	Week Ended July 1 Index†
Northeastern	227,117	85	102
Buffalo	77,884	80	84
Pittsburgh	330,910	82	86
Youngstown	125,786	74	90
Cleveland	98,151	106	122
Detroit	131,146	125	132
Chicago	415,224	111	115
Cincinnati	79,175	105	107
St. Louis	42,040	80	87
Southern	113,816	105	113
Western	135,619	116	120
Industry	1,779,000	95.5	103.3

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



July 11, 1961	Week Ago	Month Ago	June Index	Year Ago
185.4	185.4	185.4	185.4	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	(N.A.)
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	193.032
Casing, Oil Well, Alloy (100 ft)	302.603
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	July 12 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

	July 12 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$130.32
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.84
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.96
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.45
Steelmaking Scrap, GT	37.00	36.67	38.17	31.67	45.50

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 12 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{1}{2}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.40	5.375

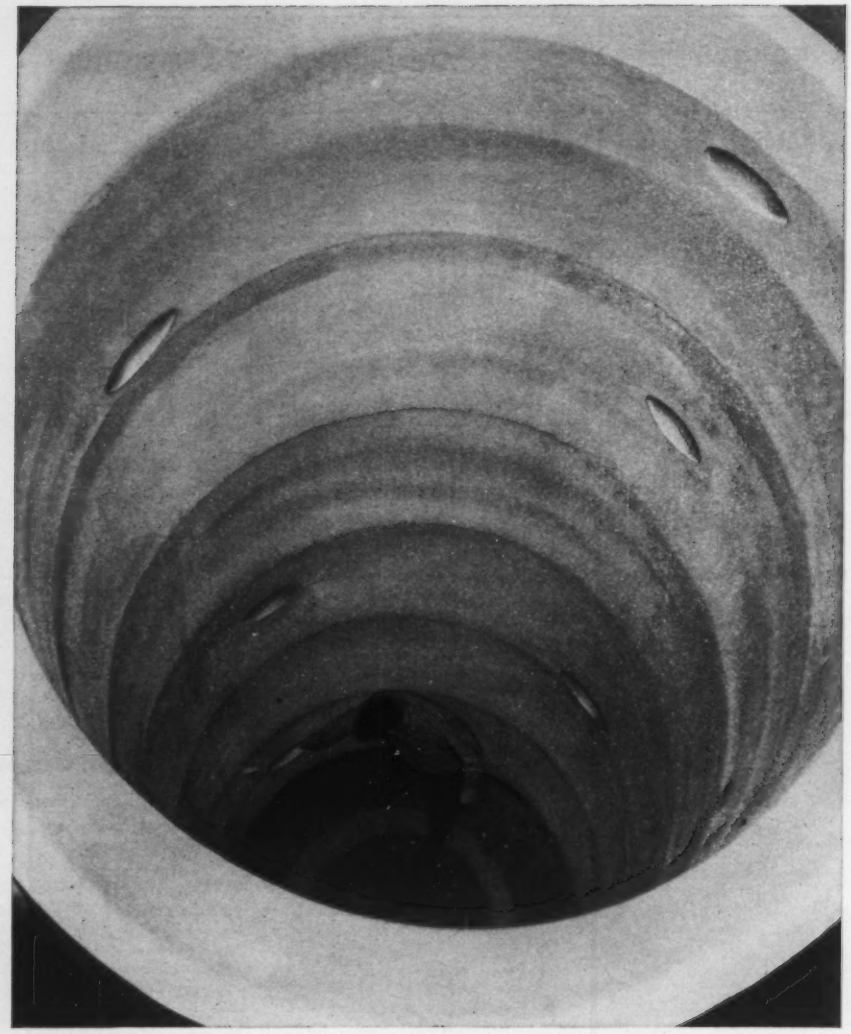
PIG IRON, Gross Ton	July 12 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$62.25
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	57.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$35.50	$36.50	$30.50	$43.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	39.50	34.00	47.00
No. 1 Heavy Melt, Chicago	36.50	35.50	38.50	30.50	46.00
No. 1 Heavy Melt, Valley	38.50	38.50	38.50	32.50	44.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	35.50	31.50	42.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	42.50
Rails, Rerolling, Chicago	58.50	58.50	58.50	49.50	67.50
No. 1 Cast, Chicago	41.50	41.50	43.50	40.50	45.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

How to reduce furnace heat loss



Vertical pit-type carburizing furnace (9' x 24') lined with a refractory insulating castable made with LUMNITE cement. Furnace temperature 1800°F. Badall Engineering & Manufacturing Co., Hammond, Ind. Castable used: "Kast-O-Lite," product of A. P. Green Fire Brick Co., Mexico, Mo.

Refractory insulating concrete, made with LUMNITE calcium-aluminate cement, is being specified for linings in many types of industrial furnaces. It helps trim fuel costs by reducing heat loss and increasing heat storage. This helps shorten heating-cooling cycles and provides closer temperature control. In addition, the smooth, jointless concrete surface reduces air infiltration.

Construction with refractory concrete is fast, easy, economical. Linings can be cast in place, troweled or "gunited." Service strength is reached in 24 hours.

For convenience, manufacturers of refractories offer castables bonded with LUMNITE cement — packaged mixtures ready for use with just the addition of water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

"USS," "Atlas" and "Lumnite" are registered trademarks

L-193

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco

Steel Prices

Mill prices as reported to STEEL, July 12, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 164; footnotes, page 166.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown Pa B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14..122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 .....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 ..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 .....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa, Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron

Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES

Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14.....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5.....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 .....8.30
S.SanFrancisco B3 .....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (including loaded extra)

Carbon

LosAngeles P2, S30...11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025

Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa. (S.R.)B14 16.10
Economy,Pa. (D.R.)B14 20.50
Econ. (DirectRolled)B14 13.55
Economy(Staybolt) B14 20.50
McK.Rks. (S.R.) L5 ...16.10
McK.Rks. (D.R.) L5 ...20.50
McK.Rks. (DirRolled) L5 13.55

BARS, Rail Steel

ChicagoHts. (3) C2, I-2 5.575
ChicagoHts. (4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa. (4) F5 ...5.675
JerseyShore,Pa. (3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 ....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw&Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ...5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ...8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 ....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ...7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ...7.425
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ...10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75
ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (1¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1.8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.35	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Mansfield,O. E6					8.10
Vandergrift,Pa. U5					8.10
Warren,O. R2 (Locore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ...8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ...8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 ..12.65
KansasCity,Mo. U3 ...12.90
LosAngeles(2) B3 .....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16, ..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11.. 10.075
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 .....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ...16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10.....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler

(14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2 I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‖
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198‖
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'aville M8	17.95	19.80†
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡
Johnstown B2	17.85	19.65‖
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50*
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	17.95	19.75‖
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

6 to 8 gage	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in. larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:
Hot Galvanized and Zinc Plated:
Packaged 39.25
Bulk 46

BOLTS, Standard stock sizes:
Plain Finish 50
Hot Galvanized and Zinc Plated:
Packaged 39.25
*Bulk 46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:
Packaged ..... +55
Bulk ..... +16

Flat Head Cap Screws:
¾ in. and smaller, 6 in. and shorter:
Packaged ..... +85
Bulk ..... +38

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam., 6 in. and shorter:
Packaged ..... +5
Bulk 19
Through 1 in. diam., longer than 6 in.:
Packaged ..... +29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:
Plain Finish 50
Hot Galvanized and Zinc Plated:
Packaged 39.25
Bulk 46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in., and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	....	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates, Carbon Base 5%	10%	15%	20%	Sheets, Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅜ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Pa., $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Nario, Ohio, $87.50. Dolomite-Magnesite: Nario, Ohio, $109.50. Magnetite: Nario, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	55.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	54.70
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$5.65*	*$5.70*	*$5.60*	*$5.50*	*$5.80*
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	*5.75*	*5.80*	*5.70*	*5.60*	*5.90*
I-Beams	*5.65*	*5.70*	*5.60*	*5.50*	*5.80*
Channels	*5.75*	*5.80*	*5.70*	*5.60*	*5.90*
Plates (basic bessemer)	*5.45*	*5.50*	*5.40*	*5.30*	*5.60*
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	*6.25*	*6.30*	*6.20*	*6.10*	*6.40*
Merchant Bars	*5.95*	*6.00*	*5.90*	*5.80*	*6.10*
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	*7.35*	*7.40*	*7.30*	*7.20*	*7.50*

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr. carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.05% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si, Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy: ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F. o. b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

CONTROL

New! Versatile Cutler-Hammer oiltight pushbuttons let you make any station you want

The new interchangeability built into these operators lets you create the station you want from a complete selection of Cutler-Hammer pushbuttons. Get them in one hole or base mounting, 6 bright colors. Thirty different circuit arrangements can be made in hundreds of varieties of stations in standard arrangements of up to 25 elements. Get up to 8 circuits on one pushbutton. They take 40% less back-panel space than next smallest unit so you get more control in less space. Get facts in PUB. LO-104-N213.

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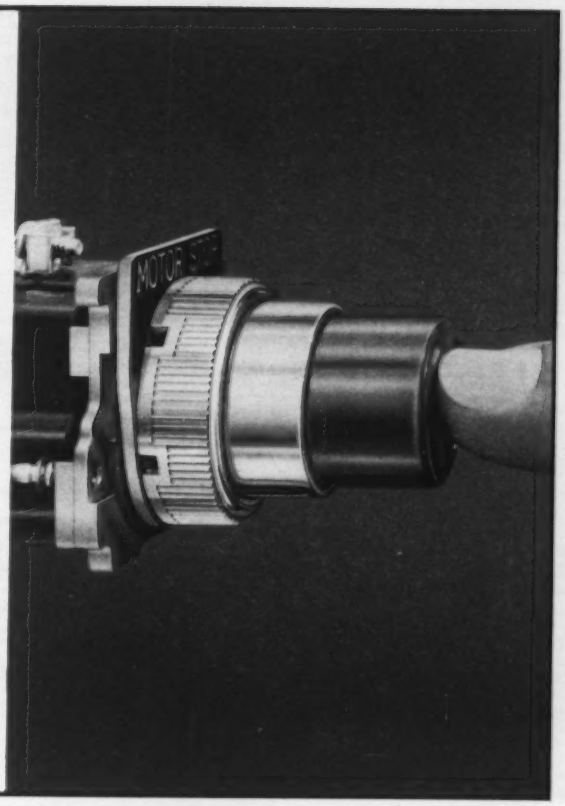

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"Axial adjustment" is an important benefit on all heavy-duty DEMING sump, end suction and turbine pumps. It allows you to merely adjust the rotary assembly and compensate for wear. Better performance immediately. No new part needed. Call your DEMING distributor or write today for full information.

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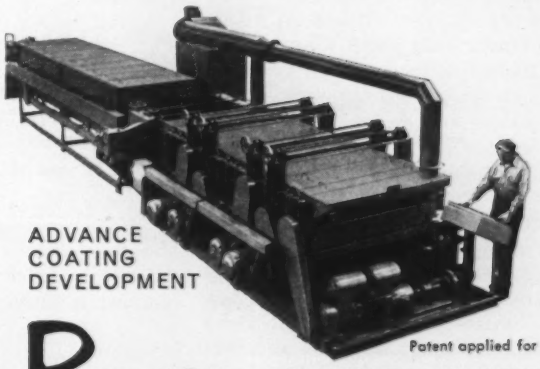

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The New Roth SIMPLIFIED coating lines mark another advancement for consistent quality drawing. Here is the answer to a highly economical and automated application for dry type drawing lubricants. This fresh approach to an integrated line reflects a 20-year tradition for progressive cost saving production.

- **Revolutionary new brush-coater**
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INVESTIGATE THE COMPLETE ROTH LINE NOW!

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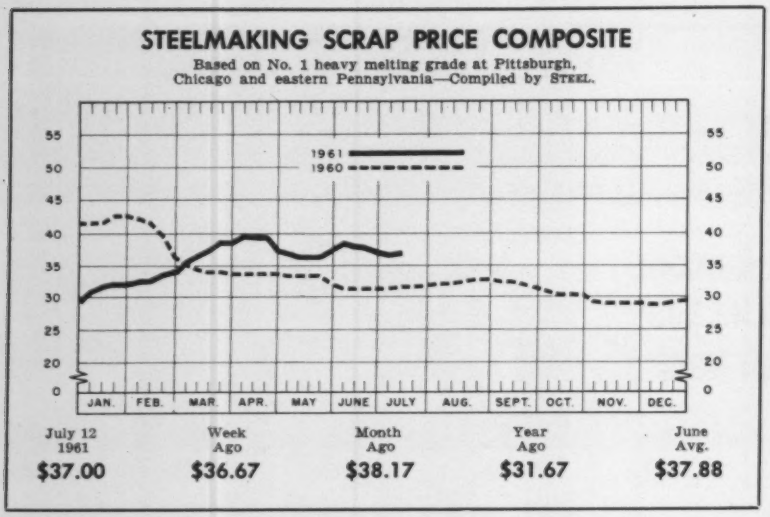

Scrap Price Trend Again Reversed

STEEL's index on No. 1 heavy melting grade advances 33 cents a ton to $37 after declining four straight weeks. Thorough buying test absent, but collections are slower

Scrap Prices, Page 174

• **Chicago**—Demand for all grades of ferrous scrap is slow. The seasonal decline in steel demand is accentuated by vacation closings of many steel consuming plants. On the basis of limited scrap purchases by mills, No. 1 heavy melting scrap, both industrial and dealer, is quoted up $1 a ton. The foundry grades continue depressed.

• **Pittsburgh**—Prices are unchanged in a stable but inactive market. Brokers' bids on scrap offered by the B&O Railroad were about the same as last month's. Other railroad lists are expected to follow the B&O pattern. Major consumers are showing no interest in buying.

• **Philadelphia**—Both domestic and foreign demand for scrap is easier. Collections of yard and industrial scrap are slow, so that the market is being maintained in fair balance. Prices are unchanged.

• **Buffalo**—Dealers are disappointed by the failure of district mills to place July delivery orders. The area market is extremely quiet with export sales providing the only business of consequence. Prices are unchanged, but tend to the weak side in the absence of a buying test.

• **New York**—Brokers' buying prices remain steady. Domestic consumption is slow, but foreign shipments of the major steel grades are holding fairly well. Collections of yard and industrial scrap are lagging.

• **Cleveland**—Although steelmaking operations here and in the Valley have turned upward following the July 4 holiday dip, the pickup has not brought any marked increase in scrap demand. Traders look for little activity the rest of this month. With metalworking plants closed for vacations, and automotive shops going down for model changeovers, scrap generation will be curtailed over coming weeks. This should firm up prices when buying is actively resumed next month.

• **Detroit**—Prices are unchanged with no major orders before the market. Only a few dealer transactions were reported last week. Traders think the market will continue slow the rest of this month unless some foreign business develops.

• **Cincinnati**—The market is quiet. Shipments are being made to a mill on its July program. Some weakness is noted in the secondary steel grades, but prices are untested. Easing in export demand is resulting in improved supply conditions.

• **St. Louis**—With demand insufficient to provide a thorough test,

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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prices are unchanged. A little tonnage is moving out of the district for export, but not enough to affect prices.

• **Birmingham** — Prices are unchanged in this market. Some electric furnace material was moved last week at the level established some time ago. The foundries also bought small tonnages of cast scrap.

• **Houston**—Mills and foundries in this area have lowered their offering prices on the premium grades of scrap by $2 a ton. The intake of yard scrap is light. The export market here and at Galveston continues to display some strength, but business has dropped off at Baton Rouge and New Orleans.

• **San Francisco**—Prices on the chief steelmaking grades have been scaled down $1 a ton, No. 1 heavy melting now being $43 and No. 2 heavy melting $40.

• **Los Angeles** — Scrap intake has dropped off, but dealers do not anticipate any shortage. Prices are firming up at $40 for No. 1 heavy melting, $37 for No. 2 heavy melting, $29-$30 for No. 1 bundles, and $25-$26 for No. 2 bundles. One district yard has completed negotiations with Japan for a $2 cut in export prices.

• **Seattle** — Exporters continue to buy scrap actively in meeting foreign commitments. Full cargoes are scheduled to leave Puget Sound this month. Some brokers report demand for No. 1 heavy melting is strong but that supplies are limited.

Finished Steel Shipments Score Sharp Gain in May

Shipments of finished steel products in May exceeded 6 million tons for the first time in a year, reports the American Iron & Steel Institute. The total was 6,047,691 tons vs. 5,133,470 in April, 1961, and 6,272,432 in May, 1960.

Sheet and strip shipments went up nearly 473,000 tons from April to May. Bar and tool steel shipments increased more than 103,000 tons. Most other products showed smaller gains, and some individual product totals were higher than in May, 1960, including hot rolled bars, reinforcing bars, standard pipe, oil country goods, drawn wire, electrolytic tin plate, and galvanized sheets.

All major market classifications received larger tonnages in May than in April. The automotive classification received 20.3 per cent of total direct mill shipments, against 16.4 per cent in April, 1961, and 17.8 per cent in May, 1960. The auto tonnage was 1,224,270, up nearly 383,000 tons from April, 1961, and 164,000 tons from May, 1960.

Steel Product Shipments
(Net tons)

Products:	May, 1961	May, 1960
Cold Rolled Sheets	1,125,771	1,356,976
Hot Rolled Sheets	657,488	721,808
Plates	488,009	529,465
Hot Rolled Bars	572,440	540,525
Electrolytic Tin Plate	532,200	473,083

Shipments By Markets
(Net tons)

Markets	May, 1961	May, 1960
Warehouses	1,116,829	1,094,860
Automotive	1,224,270	1,060,029
Construction	853,273	916,341
Containers	651,884	605,807
Machinery, etc.	336,856	364,785

Iron Ore Statistics — May, 1961

Iron Ore in Inventory—May, 1961
(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
At Furnace Yards						
Start of Month	26,561,797	3,311,244	1,204,243	3,250,479	17,098,605	51,426,368
End of Month in:						
Mass., N. Y.	2,065,680	29,783	33,943	149,714	316,963	2,596,083
Pennsylvania	5,713,162	400,670	23,846	91,278	7,980,489	14,209,445
Md., Va., W. Va.	373,599	6,786	.....	1,026,561	2,938,420	4,345,366
Ky., Tenn., Tex.	223,737	158,957	.....	120,746	83,948	587,388
Alabama	871	1,782,166	.....	114,685	3,686,239	5,583,961
Ohio	6,869,268	20,101	614,513	1,366,375	1,292,311	10,162,568
Indiana	5,088,192	28,578	338,066	1,023	75,209	5,531,068
Illinois	3,310,292	63,861	25,530	.....	241,560	3,641,243
Mich., Minn.	2,237,795	.....	204,901	32,998	270,490	2,746,184
Colo., Utah, Calif.	.....	843,582	.....	.....	1,753	845,335
Undistributed	426	2,435	.....	.....	643	3,504
End of Month Total	25,883,022	3,336,919	1,240,799	2,903,380	16,888,025	50,252,145
At U. S. Docks	2,748,819	.....	215,327	891,898	2,439,879	6,295,923
Total U. S.	28,631,841	3,336,919	1,456,126	3,795,278	19,327,904	56,548,068
In Canada	1,445,727	.....	85,802	192,779	66,769	1,791,077
Total U. S.-Canada	30,077,568	3,336,919	1,541,928	3,988,057	19,394,673	58,339,145

Consumption of Iron Ore—May, 1961
(Gross tons)

	U. S. Iron Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
In U. S.						
Mass., N. Y.	428,596	3,742	16,556	14,561	30,371	493,826
Pennsylvania	712,460	268,468	1,840	65,974	733,052	1,781,794
Md., Va., W. Va.	132,631	19,994	.....	332,804	386,054	871,483
Ky., Tenn., Tex.	45,198	75,480	.....	57,092	31,699	209,469
Alabama	.....	283,392	.....	1,753	133,101	418,246
Ohio	1,038,904	6,069	64,678	164,491	136,942	1,411,084
Indiana	1,023,527	.....	69,868	5,429	30,321	1,129,145
Illinois	572,298	29,362	10,294	.....	32,065	644,019
Mich., Minn.	499,746	.....	81,168	30,234	58,545	669,693
Colo., Utah, Calif.	.....	665,642	.....	.....	18,335	683,977
Undistributed	117	74	.....	.....	114	305
In U. S.						
Blast furnaces	3,011,709	894,623	124,445	282,337	518,100	4,831,214
Steel furnaces	127,823	50,556	3,496	13,718	439,125	634,718
Sintering	1,313,822	407,044	116,463	376,283	633,374	2,846,986
Miscellaneous	123	.....	.....	.....	.....	123
Total U. S.	4,453,477	1,352,223	244,404	672,338	1,590,599	8,313,041
In Canada						
Blast furnaces	273,915	.....	99,454	117,684	3,092	494,145
Steel furnaces	.....	.....	.....	26,041	7,414	33,455
Sintering	44,120	.....	15,781	28,610	.....	88,511
Miscellaneous	18	.....	.....	.....	.....	18
Total Canada	318,053	.....	115,235	172,335	10,506	616,129
Total U. S.-Canada	4,771,530	1,352,223	359,639	844,673	1,601,105	8,929,170

Data from the American Iron Ore Association.

Structural Shapes . . .

Structural Shape Prices, Page 163

Structural steel bookings in June were the largest so far this year. Users stopped liquidating stocks and have been buying as much steel as they've been using. July bookings and shipments are off seasonally at fabricating plants, but demand for steel hasn't slipped as much as producers had expected.

Buyers are showing interest in a possible price increase this fall. However, they haven't started hedging, feeling there'll be ample time for inventory building in August and September.

Labor disputes have depressed construction in spots. Building work in New York City has been held up by strikes of three labor groups.

Inland Steel Co., Chicago, now can produce 8 by 8 in. by 36 lb bearing piles. Tonnages can be produced on the same complement of rolls used for the regular 8 x 8 in. in wide flange beams.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, July 12, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 12	$37.00
July 5	36.67
June Avg.	37.88
July 1960	31.63
July 1956	47.70

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	23.00-24.00
No. 1 busheling	35.00-36.00
No. 1 factory bundles	43.00-44.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	37.00-38.00
Heavy turnings	27.00-28.00
Punching & plate scrap	41.00-42.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	42.00-43.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*37.00-38.00*
No. 1 hvy. melt., dealer	*35.00-36.00*
No. 2 hvy. melting	30.00-31.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling, indus.	*37.00-38.00*
No. 1 busheling, dealer	*35.00-36.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	43.00-44.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	36.00-37.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R. R. heavy melt.	38.00-39.00
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	56.00-57.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	62.00-63.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	41.00-42.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	39.00-40.00
Low phos. punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	*44.00-45.00*
Rails, rerolling	55.00-56.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	38.00-39.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	*23.00*
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	*15.00*

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	39.00
No. 2 heavy melting	35.00
No. 1 bundles	43.00
No. 2 bundles	25.00-26.00
No. 1 busheling	43.00
Electric furnace bundles	44.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	41.00-42.00
Angles, splice bars	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	*21.00-22.00*
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	*38.00-39.00*
2 ft and under	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*37.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*25.00-26.00*
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	*43.00***
No. 2 heavy melting	*40.00***
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

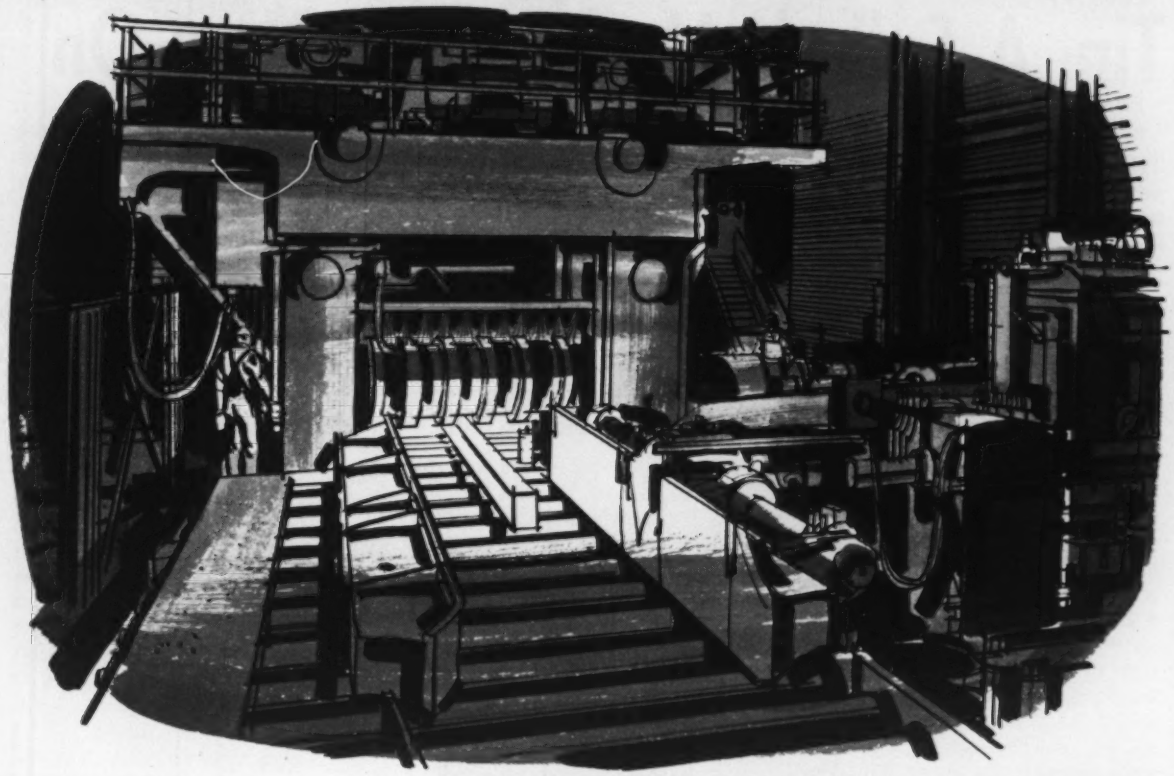
No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



SULPHUR . . . FRIEND OR FOE?

Sulphur is an element of several faces. As a sulphuric acid compound it occupies an important place in the steel industry where it is used for cleaning metal, the recovery of ammonia products from gas and in making chemical analyses.

As an element in the composition of steel, however, sulphur is welcome only for the free machining properties it brings to certain grades. A small percentage can more than double the speed and ease with which steel bars can be machined into gears, screws, bolts, and other small parts. There is even a free machining type of stainless steel. In these instances, sulphur serves the steel industry as a friend.

But, sulphur can be an enemy as well when it appears in the steelmaking furnace as an unknown residual element.

Sulphur makes steel hot short, meaning that it cracks and tears in rolling or forging processes. It can ruin a heat of stainless steel when its presence is unknown. Therefore, scrap, high in sulphur content, unless it is properly segregated, must be considered a foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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FOREIGN TRADE — LURIA INTERNATIONAL DIVISION, CHRYSLER BUILDING EAST, NEW YORK, N. Y. 5950 S. BOYLE AVE., LOS ANGELES 58, CAL. • *Cable Address:* FORENTRACO

Tin: A Seller's Market from Now On

Nonferrous Metal Prices, Pages 178 & 179

THE FRENZIED activity that had producers and consumers alike in a constant state of agitation for weeks has disappeared from the tin market for the time being.

Now, tinmen have time for some sober reflection to try to figure out what happened. One fact is apparent: The recent gyrations didn't just signify a temporary bullish note in the market. There's been a basic change.

Some tinmen say the change started four years ago, when consumption began to run ahead of production, the recent upset merely spotlighting a long term problem.

• **Looking Ahead**—The days when tin was traded in a buyer's market seem to have vanished. For the foreseeable future, the metal will be in a seller's market. You won't see prices sinking to what used to be considered normal levels, either. The consensus of current forecasts seems to be: A price of $1.15 to $1.20 a pound for the foreseeable future.

• **Still Nervous** — The market is quiet now, and sellers report little activity as buyers hold back to see what's going to happen. Government sources report the U. S. has finally decided to dispose of the 4000 tons of metal held at Texas City, Tex. At press time, the only factor delaying disposal was the ironing out of administrative details.

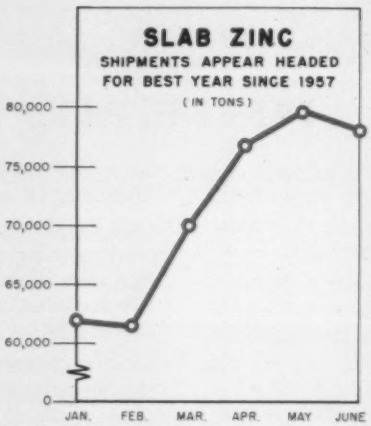
Release of that tin will result in an outward show of calm in the market, but underlying nervousness will remain because of a feeling that the price could again gyrate.

Keep an eye on what happens at the next meeting of the International Tin Council in London (Aug. 22) as a clue to what direction the market will take. The council's first meeting under the second international tin agreement (held earlier this month) was a disappointment to metalmen who interpreted lack of concrete action as stalling.

Two things emerged from the meeting: 1. The U. S. was asked to sell tin to the ITC from the strategic stockpile. That would take Congressional action. 2. Under consideration is a move to raise the price at which the ITC's buffer stock manager must sell tin (now $1.10 a pound). The feeling evidently is that such a move would give the council more flexibility to halt a runaway market.

Users Study Nickel Hike

Major nickel consumers are still trying to decide whether to pass along or absorb the recent sharp hike in base nickel prices. Nowhere is that more true than in stainless steel, where at press time one company had advanced prices and the others were standing pat.



Source: American Zinc Institute Inc.

"The increase caught me totally by surprise," admits the purchasing director of a major steel producer, and his reaction is typical. Most observers had expected an adjustment in 1962—both the timing and the amount of the increase (7.5 cents a pound for electrolytic refined metal) came as a shock.

International Nickel Co. gave as reasons for the hike higher operating and labor costs (of more than $50 million) since nickel was last bumped on Dec. 6, 1956, and to compensate for ". . . discounts which have prevailed for the U. S. dollar that have meant a loss to the company of a number of millions of dollars in each of the last four years."

Reaction from stainless steel producers, looking at the already weak price picture in their industry, was "miserable timing."

Zinc Holds Up Well

The fast paced galvanizing market is consuming enough zinc to more than make up for the continued weak demand from diecasters. June shipments of slab zinc rose to 78,050 tons. On a daily basis, it was the best month of the year (May with 31 days saw shipments of 79,599 tons). So far, July sales are about on a par with June's, but they may dip later in the month as customers close down plants for traditional midsummer vacations. This year, though, say zincmen, the lull won't be as great as usual.

The prime western price, at 11.50 cents a pound, appears stable. It's another story in the premium grades where special high grade is going for 12 cents a pound, 0.5 cent under the quoted price. Diecasting alloy ingots are off correspondingly. Big diecasting markets, like autos and appliances, have been slow all year. Outboard motors are way down.

Producers see little chance for improvement this month or next. They're hoping a strong demand for 1962 model cars will turn the trick later in the year.

Total zinc shipments for 1961, though, should be well above last year's. STEEL estimates they'll go over 900,000 tons.

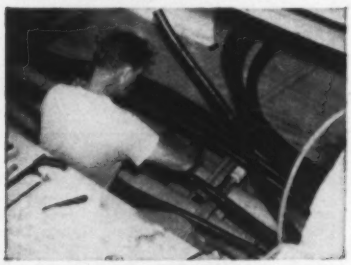
Copper Is Firm

Copper sales continue good even though they're down slightly from June. As in zinc, the normal midsummer lull probably won't be as pronounced as usual. The price appears to be firm—there are neither pressures for a higher nor lower quotation.

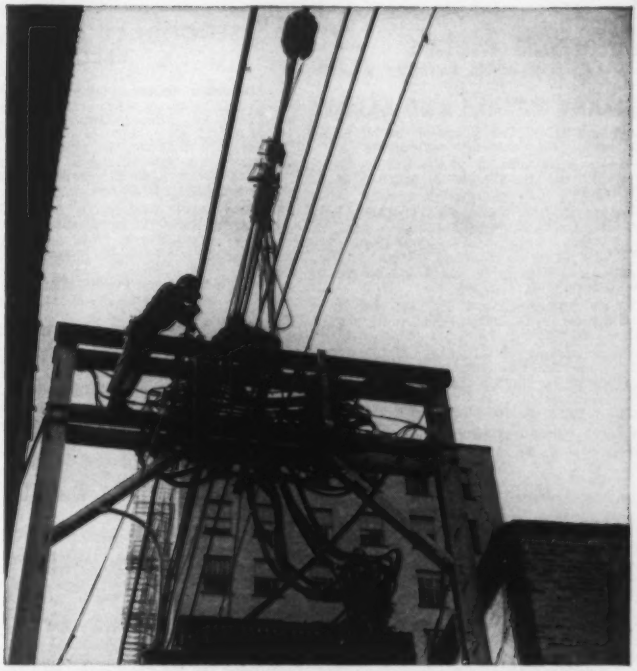
NAME YOUR CABLE PROBLEM— THERE'S A GOOD CHANCE DURASHEATH CAN SOLVE IT.

—versatile rubber-insulated neoprene-jacketed power cable that facilitates circuit installation whenever—wherever needed—fast, easily, at low cost. Here are 5 examples.

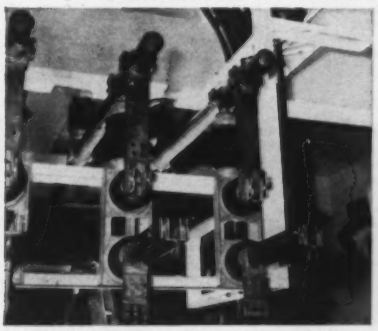
Riser Cable. In this installation, Durasheath not only serves as an aerial cable, but also as a riser cable running down the side of the building. Without additional terminations, it then drops down-inside to the plants' power-control center. It's another example of the way versatile Anaconda Durasheath adapts itself to your power cable needs.



Installed in ducts. Durasheath's flexibility meant quick and easy installation here. And once installed, its tough neoprene jacket assures long, trouble-free life. Because Durasheath adapts itself to so many uses, your inventory problems are lessened—fewer cables need be carried in stock.



Field or factory-assembled aerial cable. Durasheath may be factory pre-assembled with standard or reverse lay. Or it can be quickly field assembled with the simple spinning operation shown here. Either way, easy splicing, tapping, and terminating result in simplified installation. No cross arms or insulators are needed.



Inside installation. Here's an application where Durasheath was quickly installed and easily terminated. Durasheath's Neoprene jacket resists abrasion, heat and fumes. *Assures dependable performance and long-range economy.*

Direct-burial cable. The moisture-, oil-, and acid-resistance of Durasheath's jacket makes it the ideal cable for direct-in-the-ground applications like the one shown above. Its flexibility cuts installation time and cost because Durasheath is easy to handle. Its durability cuts maintenance costs.

ANACONDA DURASHEATH ALL-PURPOSE POWER CABLE is available in all sizes, single and multiple conductor, copper or aluminum, 600 to 35,000 volts. *Insulations:* Type RHW, Anaconda ANW, AHW, or AB butyl rubber compounds; each designed for specific purposes. *Jacket:* specially compounded neoprene with high resistance to flame, oil, acids, alkalies, sunlight, and ozone. Has high tensile strength and is flexible over a wide range of temperatures.

For complete information about Anaconda Durasheath contact Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York, Department EFL-1-S.

61358-P

ASK THE MAN FROM
ANACONDA®
FOR DURASHEATH ALL-PURPOSE POWER CABLE

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg 36.00-37.50 per gram; 1-10 kg 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $195-199 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pigs, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 116.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; 188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 23.50-29.00; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal	51.94	47.25	...	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10%	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clippings, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 15.50-16.00; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.25; light copper 24.00; refinery brass (60% copper) dry copper content, 24.75-25.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.00; light copper, 23.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 18.00; yellow brass turnings, 15.50; radiators, 19.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 135.50; 200-499 lb, 134.00; 500-999 lb, 133.50; 1000 lb or more, 133.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.90; 100-600 lb, 77.20; 700-1900 lb, 74.50; 2000-9900 lb, 72.60; 10,000 lb or more, 71.30.

Stannous Chloride (Anhydrous): 100 lb, 145.40; 400 lb, 135.40; 800-19,900 lb, 114.10; 20,000 lb or more, 109.90.

Stannous Sulphate: Less than 50 lb, 152.80; 50 lb, 122.80; 100-1900 lb, 120.80; 2000 lb or more, 118.80.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3880 tons, state office building, Trenton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

526 tons, six, 3-span, composite, wide flange beam bridges, Winooski, Vt., I-89-3-(13) to Vermont Structural Steel Co., Burlington, Vt.; J. F. Fitzgerald Construction Co., Canton, Mass., general contractor; 13,200 linear feet, steel piles, to H. P. Fleming Co., South Portland, Maine.

425 tons, test facilities, General Electric Co., Valley Forge, Pa., through Huber, Hunt & Nichols, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, 15 tramway towers, Cape Lisburne and Tin City, Alaska, to West Coast Steel Works, Portland, Oreg.; S. S. Mullen Inc., Seattle, general contractor.

320 tons, gates and hoists, Wanapum Dam, Columbia River, to Pacific Car & Foundry Co., Seattle.

300 tons, radar towers in three Pacific Northwest areas, to Portland Erection Co., Portland, Oreg., by U. S. Engineer.

221 tons, mostly wide flange, Navy Purchasing Office, Washington, to Meldon Steel Co., Westbury, N. Y.

220 tons, one, single span, and one, two span, composite wide flange beam bridges, Bridgewater, Vt., to City Iron Works, Wethers-

CLASSIFIED ADVERTISING

STEEL PLANT LIQUIDATION

Equipment And Real Estate Surplus To Crucible's Needs

1—60" Hot Sheet Mill, electric programed with console, recently rebuilt for Titanium; 1—60" Cold Sheet Mill complete excepting possibly for motor; 1—14" incomplete Bar mill and residue from two 9" Bar mills; Annealing furnaces, shears, Roller levelers, a complete Boiler House, Roll lathes, compressors, Hammers, Ammonia Dissociator, Pack Welders, Exogas Generator, Swing Grinders, Car Puller, Machine tools, Billet drilling machines, etc. Write for brochure.

This 700,000 sq. ft. plant is being divided up into parcels to suit the requirements of smaller operations, varying from 5,000 to 500,000 sq. ft. As a result of the subdividing, there will probably be both buildings and cranes for dismantlement. For information on the Real Estate only write Arthur F. Texter and Associates, Realtors, 720 Wood St., Pittsburgh, 21, Penna.; for the equipment, or buildings and cranes for dismantlement, write to Hetz.

HETZ CONSTRUCTORS INC. P.O. BOX 4073 PITTSBURGH 1, PA.

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Machinery For Sale

Giant Horiz. **BORING MILL**
18" dia. Spindle, 13' Vert. &
30' Horiz. Travel
100 to 4000 T **PRESSES**
Unused & little used U. S. Govt. surplus machy. Mfgd. as late as 1955. Sacrifice before removal.
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1957F Clay, Detroit 11, TR 2-1270

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SUPERINTENDENT BAR AND ROD MILL—Age 46. 27 years experience in steel plant operation including 11 years as a roller. Reply Box 945, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $20.00, each additional word, .40; all capitals, 50 words or less $23.00, each additional word .50; all capitals leaded, 50 words or less $28.00, each additional word .65. "Position Wanted" set solid, 25 words or less $5.50, each additional word .22; all capitals 25 words or less $7.50, each additional word .29; all capitals leaded 25 words or less $9.00, each additional word .35. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

Help Wanted

SPECIALTY STEEL SALES PRODUCT MANAGER

An outstanding opportunity exists for a man having broad experience and knowledge of the specialty-steel rod, bar, and billet market. The successful applicant must have superior technical sales background and be capable of taking complete charge of rod, bar and billet sales in titanium, stainless and specialty steels.

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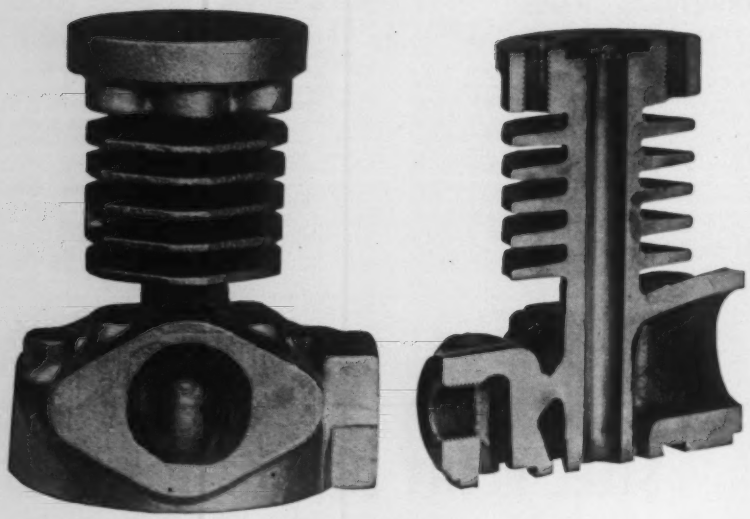

HIGH PRESSURE LOW COST

This 8 pound Meehanite Metal casting made for the Joy Manufacturing Co. by Hamilton Foundry is a fourth stage air compressor cylinder. Pressures build up to 6,000 p.s.i. and require a high strength, pressure tight and wear resisting casting. Alloyed Meehanite®, oil quenched and tempered, raised Brinell hardness of the cylinder wall to 275-300, and increased tensile strength to 60,000 p.s.i. Meehanite was chosen for this casting because controlled structure and small uniform flake graphite produce pressure tight castings of uniform density and strength.

Manufacturing costs drop when uniform, high quality castings go through production. In this case, Meehanite castings from Hamilton Foundry give Joy tight control on finished parts costs by combining dimensional accuracy, uniform machinability, a low rejection rate, and delivery on schedule. Pressure tightness, long service life and fine surface finish insure Joy's reputation for product quality.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

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HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

field, Conn.; W. W. Wyman Co., Greenfield, Mass., subcontractor for bridges.

208 tons, Laramie Avenue connection for Lake Street track elevation, Chicago, for Chicago Transit Authority, to Vierling Steel Works, Chicago; Alfred Benesch & Co., Chicago, engineer.

STRUCTURAL STEEL PENDING

4734 tons, superstructure, Theodore Roosevelt Bridge, federal aid, interstate project, No. 1-66-1 (14), Contract 3, Washington, D. C.; bids July 26, Department of Highways & Traffic, District of Columbia; also required, 482 tons of reinforcing bars.

302 tons, state highway bridge, Route 7 over Interstate Route 95, Plymouth, Maine; bids July 19, Augusta, Maine; also required, 85 tons of reinforcing bars.

200 tons, Central Junior High School, Anchorage, Alaska; general contract to C.&R. Builders, Seattle, at $1,750,000, base.

REINFORCING BARS . . .

REINFORCING BARS PLACED

4500 tons, Philadelphian Apartments, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

2750 tons, Hopkinson Apartments, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, Nazareth Hospital, Philadelphia, through Turner Construction Co. to the U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh.

750 tons, spillway outlet works, Council Grove Dam, Grand (Neosho) River, Kansas; bids Aug. 23 to the U. S. Engineer, Tulsa, Okla.

600 tons, addition to Suzzalo Library, University of Washington, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; James I. Barnes Construction Co., Seattle, is general contractor.

268 tons, six composite wide flange beam bridges, Winooski, Vt., 1-89-3-(13) to Bethlehem Steel Co., Bethlehem, Pa.; J. F. Fitzgerald Construction Co., Canton, Mass., general contractor.

270 tons, also piling, trash racks, etc., U. S. Soil Conservation Service, flood water project, Snohomish County, Wash.; bids about Sept. 1; Stevens & Thompson, Seattle, engineer.

215 tons, 455 ft bridge, Josephine County, Oreg.; Hamer Corp., Roseburg, Oreg., low at $654,420 to the Bureau of Roads, Portland, Oreg.

150 tons, parking garage on 69th St., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

120 tons, Kent General Hospital, Dover, Del., through Rupert Construction Co., Wilmington, Del., to Bethlehem Steel Co., Bethlehem, Pa.

PLATES . . .

PLATES PENDING

1500 tons, penstocks, Round Butte power project, Deschutes River, Oregon; bids to Portland General Electric Co. in October or November.

300 tons, penstocks, Cougar Dam, Oregon; rebids soon to the U. S. Engineer, Portland, Oreg.

154 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia; bids July 31.

100 tons or more, 500,000 gallon welded steel water tank, also alternatives; bids to King County Water District No. 56, Seattle, July 19.

RAILS, CARS . . .

RAILROAD CARS PLACED

Reserve Mining Co., Silver Bay, Minn., 340 ninety-five ton ore cars, to the Huntington (W. Va.) plant of ACF Industries Inc., New York.

Rede Ferroviaria Federal S.A., Brazil, 23 rail diesel passenger cars, to Budd Co., Philadelphia; the cars will operate on the Central de Brazil Railroad; construction is scheduled to start in October, with deliveries beginning around mid-1962.

Missouri-Kansas-Texas, 94 freight cars to Pullman-Standard Div., Pullman Inc., Chicago. The list includes 70 boxcars and 24 flatcars.

Northern Pacific, twenty, 70 ton covered hoppercars, to General American Transportation Corp., Chicago.

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Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

STEEL
The Metalworking Weekly

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The VCA line of ferroalloys is the top quality line, so naturally it's handled by the top quality distributors ...all carefully selected for their ability to give you complete and efficient service from strategically located warehouses. Make a note of your nearest VCA distributor from the list below and call him when you want the best—Vancoram ferroalloys.

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OPERATING AT [illegible]OUTH STEEL CORPORATION, TRENTON, MICHIGAN

Designed and Built by MESTA

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